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SITE NAME	SAUGET AREA 1
DOC ID #	154803
DOCUMENT VARIATION	_X_ COLOR **OR** _X_ RESOLUTION
PRP	RMD - SAUGET AREA 1
PHASE	E ; SAS
OPERABLE UNITS	
PHASE (AR DOCUMENTS ONLY)	___ Remedial ___ Removal ___ Deletion Docket ___ ___ Original ___ Update # ___ Volume ___ of ___

COMMENT(S)

MISCELLANEOUS

EXHIBIT 1

Technical Report ---
Comments on Sauget Area 1 HRS Scoring
(Menzie-Cura & Associates, Inc., Dec. 12, 2001)

is bound separately.

Exhibit 2

AFFIDAVIT OF JOHN A. FIORE

COMES NOW Affiant, John A. Fiore, upon his oath and states as follows:

1. I am currently the owner, and an employee of Maverick Construction Management Services, Inc. ("Maverick), having worked for Maverick for almost four (4) years. My current work address is: Maverick Construction Management Services, Inc., 15 Cedar St., Auburn, MA 01501.

2. Maverick has been retained by Solutia Inc. ("Solutia") as Construction Manager for the culvert replacement and sediment removal projects being implemented by Solutia pursuant to the June 21, 1999 Unilateral Administrative Order ("UAO"), No. V-W-99-C-554, for the culvert replacement work, and the May 31, 2000 Unilateral Administrative Order, No. V-W-99-C-554, as amended, for the sediment removal work.

3. As Construction Manager, I began working on these projects in June 2000. I have been on-site in Sauget, Illinois performing work related to the culvert replacement and sediment removal projects since July 2000.

4. Work under the sediment removal UAO began in November 2000 when dewatering equipment was installed in the Creek. Removal of creek sediments began in June 2001. By December 6, 2001, approximately 40,000 cubic yards (loose) of contaminated sediments had been removed from Creek Segments B through E.

5. Removal of creek sediments from Creek Segment F is expected to be completed by the end of February 2002.

6. Construction of the on-site containment cell commenced on April 11, 2001, and was completed on September 14, 2001. Sediment placement in the cell began on September 26, 2001. It is estimated that all excavated sediments will be in the cell by the end of February 2002.

I declare under penalty of perjury that the foregoing is true and correct.

FURTHER, the Affiant sayeth not.

Date:

John A. Fiore

Subscribed and sworn to before me, a Notary Public, this 11th day of December, 2001.

Notary Public

My commission expires: 10.18.05

LYNNE L. ANGLE
Jefferson County
My Commission Expires
October 18, 2005

Exhibit 3

AFFIDAVIT OF DONALD D. RIDENHOWER

COMES NOW Affiant, Donald D. Ridenhower, upon his oath and states as follows:

1. I am a current employee of Solutia Inc. ("Solutia"), and have worked for Monsanto Company and then Solutia, for the past twenty-five (25) years. My current work address is: Solutia Inc., 500 Monsanto Ave., Sauget, Illinois 62206-1198.

2. I have worked at Solutia's W.G. Krummrich Plant in Sauget, Illinois since mid-1995. While working at the W.G. Krummrich Plant, I have and continue to hold the following positions: Emergency Response Coordinator (Chief of the Solutia Fire Department SG-546), Coordinator of Community Affairs, and Supervisor of Plant Security and Shift Supervision. I began my role of Coordinator of Community Affairs for the Solutia Krummrich Plant in August 2000.

3. Since August 2000, when I began my role of Coordinator of Community Affairs, I have attended every Cahokia Town Hall meeting on behalf of Solutia. At these meetings, I provide presentations and answer questions concerning the investigatory and removal work being conducted by Solutia in the Sauget area. The PowerPoint presentation attached to this Affidavit is a true and accurate copy of the presentation that I gave at the Cahokia Town Hall meeting on November 27, 2001.

4. Since November 2000, Solutia has published a periodic newsletter entitled "Creekside Commentary" for the residents of Cahokia and Sauget, to keep the residents informed of cleanup activities in the area. The issues of "Creekside Commentary" attached to this Affidavit are true and accurate copies of Solutia's "Creekside Commentary" from November 2000 through October 2001.

5. Since approximately September 2000, I have operated a "Solutia Community Hotline" (618-910-2332) to address residents' concerns as they arise.

I declare under penalty of perjury that the foregoing is true and correct.

FURTHER, the Affiant sayeth not.

Date:

Donald D. Ridenhower

Subscribed and sworn to before me, a Notary Public, this 10th day of December, 2001.

Notary Public

My commission expires: 10-18-05

LYNNE L. ANGLE
Jefferson County
My Commission Expires
October 18, 2005

SOLUTIA

Cahokia Town Hall Meeting

November 27, 2001

SOLUTIA

Area I Update

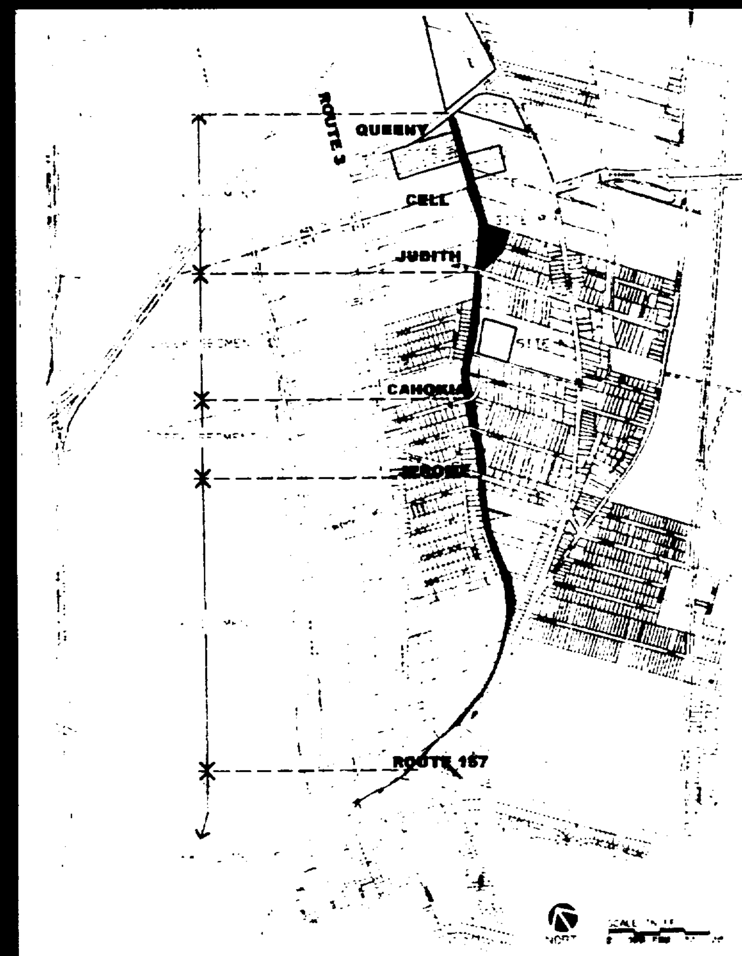
1. Finish planned sediment removal this week.
2. New section of creek added to removal order (Southwest of Route 3 - called Creek Sector F).
3. Slide show of work completed over the past year.

SOLUTIA

Progress in 2000-2001

- The green shading indicates where creek sediment removal is complete.

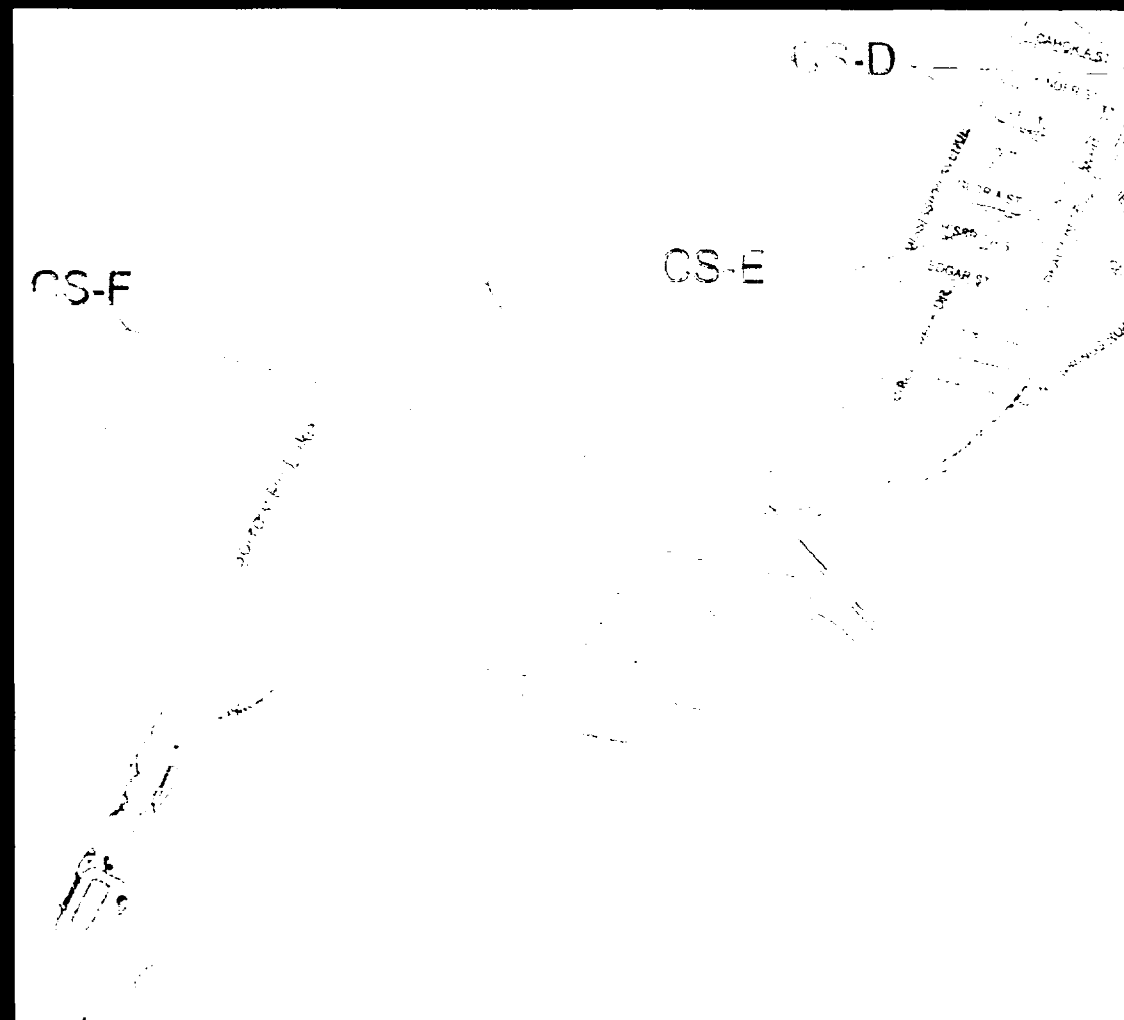
- The bottom of the map shows where Creek Sector F begins.



SOLUTIA

Creek Sector F

- Sediment removal in Creek Sector F should take us about 8 weeks providing the weather holds.



SOLUTIA

Work Begins Fall 2000

Two areas at Cargill Road had new culverts installed to correct restricted water flow during heavy rains.

SOLUTIA

Culvert Cleanout

Before dewatering work in the creek could begin, culverts had to be cleaned out.

Most were 50-90% blocked with mud.

SOLUTIA

Retention Basin Construction

Retention basins were constructed as a control measure to prevent sediment from being transported down stream during storms.

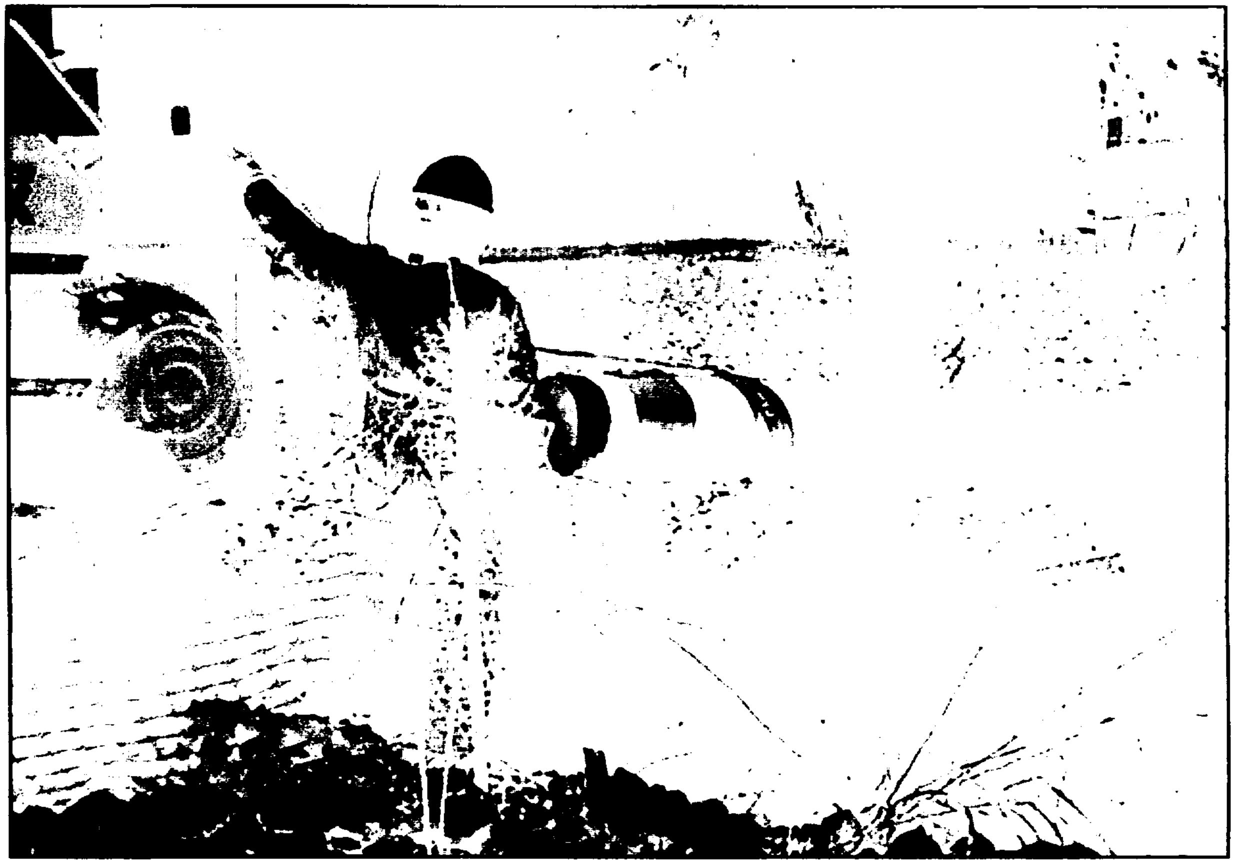
SOLUTIA

Creek Dewatering System

Fall 2000: This photos shows heat welding of the Creek Dewatering Pipe.

SOLUTIA

Dewatering Pipe Installation



Fall 2000: Pulling the dewatering pipe down stream using a bull dozer equipped with a winch.

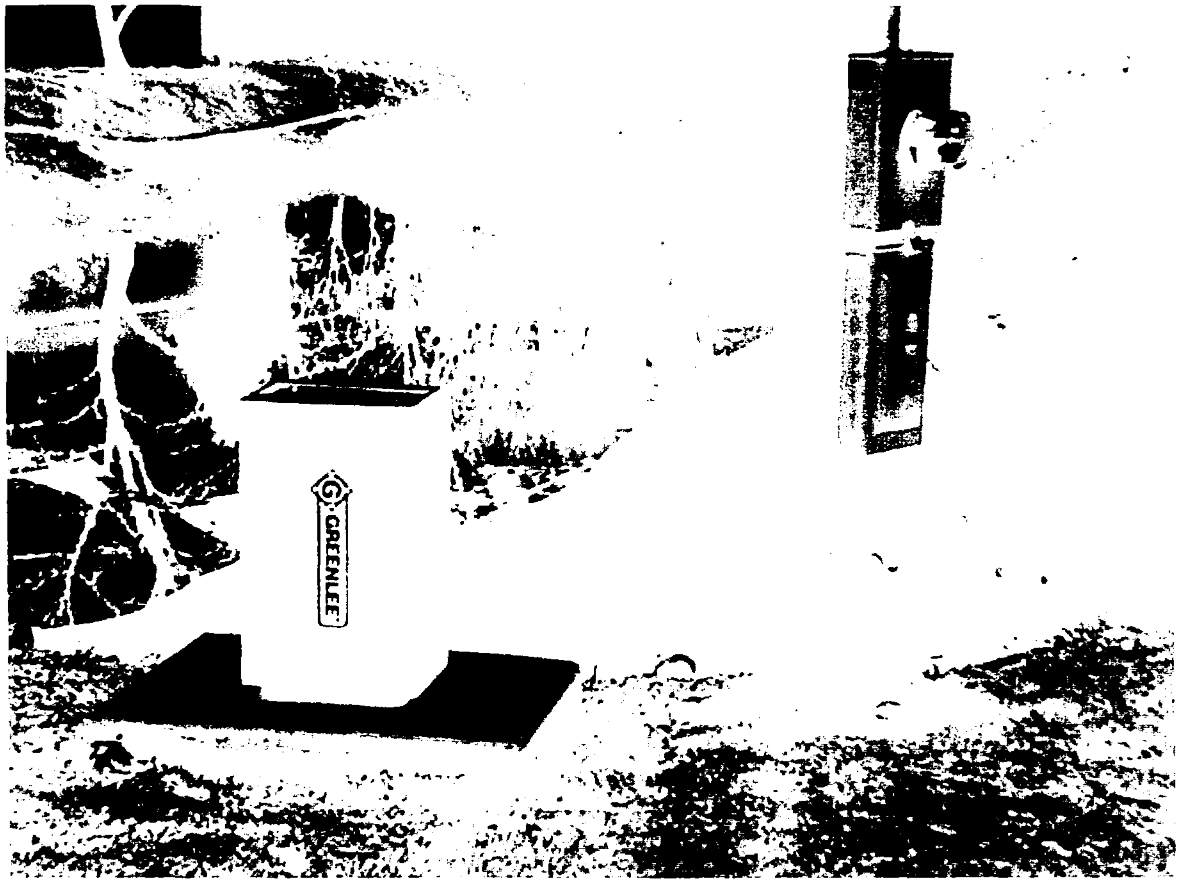
SOLUTIA

Dec. 2000, 6 inch snowfall

Weather did not always cooperate but construction of the dewatering system continued.

SOLUTIA

Creek Dewatering Begins



Late Winter 2000: Power supplies were installed to run the creek dewatering pumps.

SOLUTIA

Creek Dewatering Begins

Typical pump station - Edgar Street

SOLUTIA

End of the Dewatering Pipe

This horseshoe-shaped diffuser keeps water velocity down to prevent erosion at the end of the sediment removal area.

SOLUTIA

Removing Brush in the Creek Bed

Spring 2001: Brush clearing operation in the creek bed in preparation for sediment removal.

SOLUTIA

Debris Staged for Removal

May 2001: Debris in the Creek near Edgar Street prior to Creek clean up

SOLUTIA

Debris Removal Progress in 2001

September 2001: The same area after clean up.

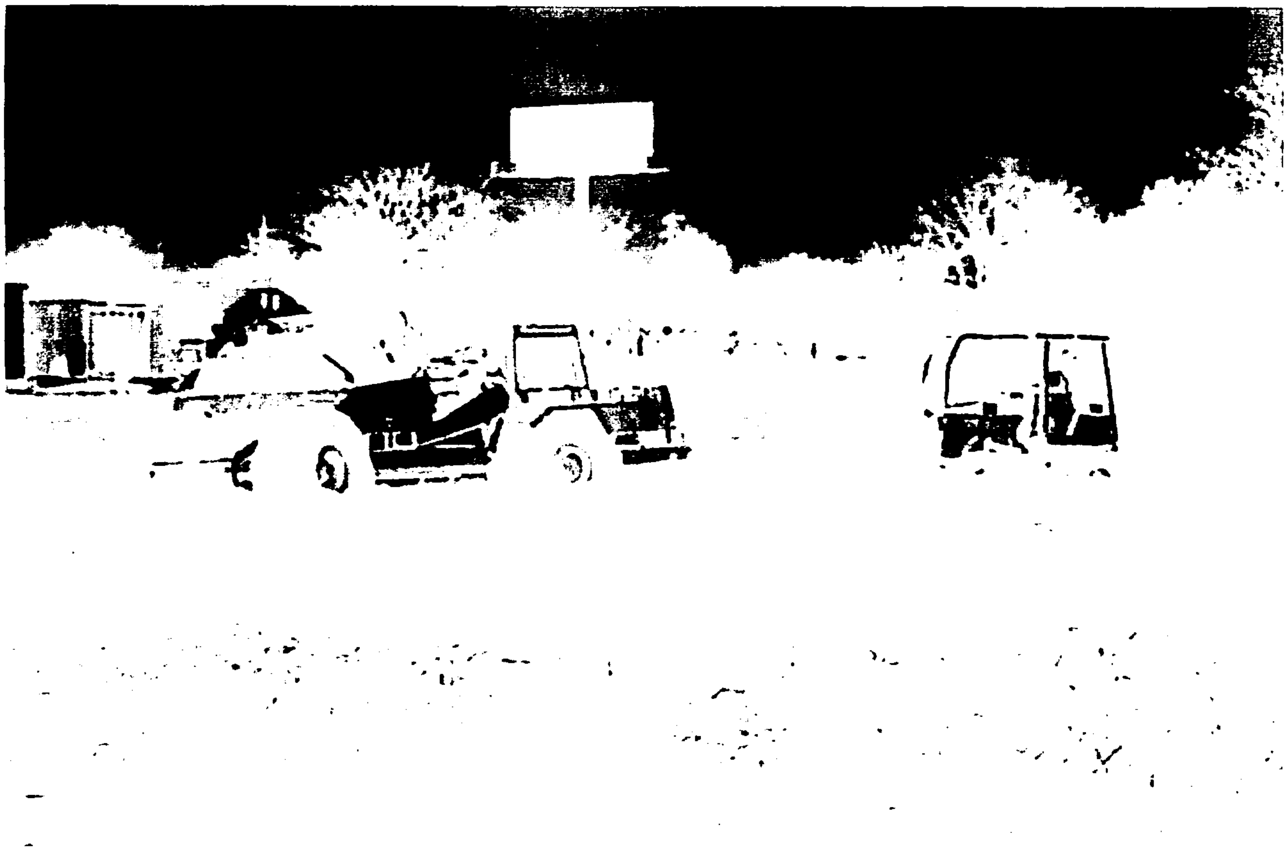
SOLUTIA

Fencing off the Work Area

Spring 2001: Orange fencing was installed to keep people and pets out of the creek during sediment removal and construction.

SOLUTIA

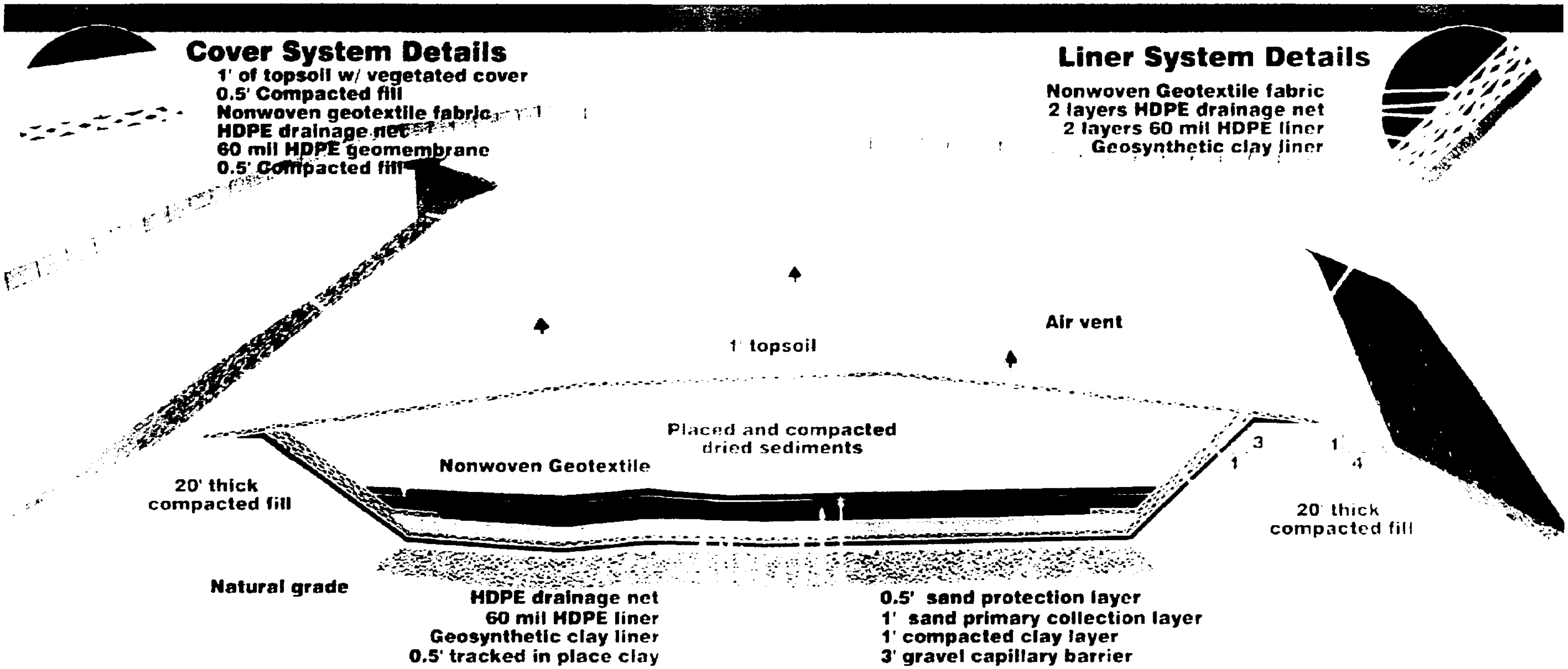
Breaking Ground for the Cell



April 2001: Breaking ground for construction of the Containment Cell.

SOLUTIA

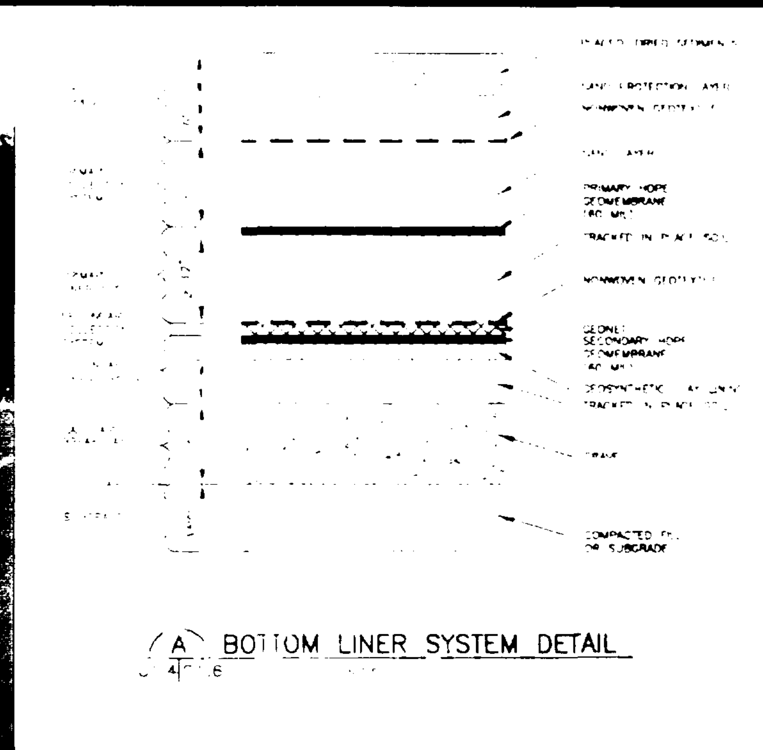
Containment Cell Design



The Containment Cell is a multi-layered, structure to safely contain sediments from the Creek.

SOLUTIA

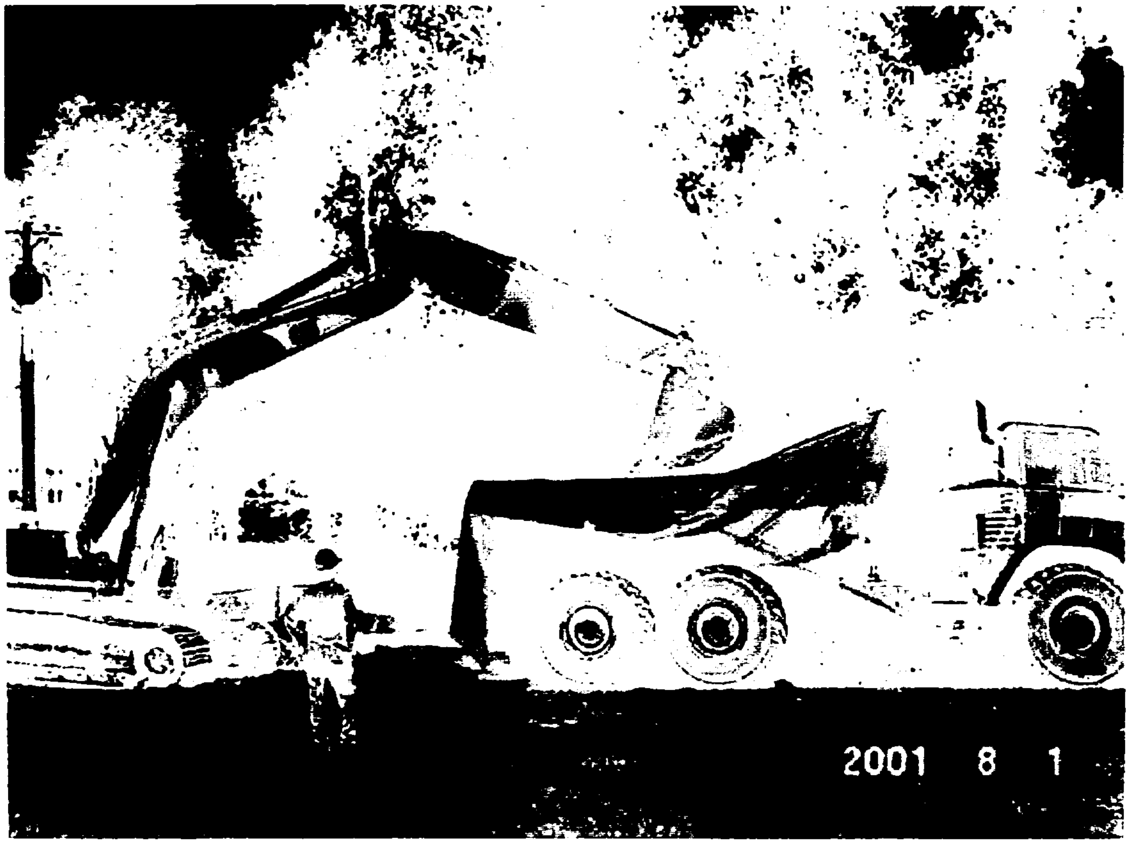
Containment Cell Construction



August 2001: This photo was taken about a week before completion of the containment cell.

SOLUTIA

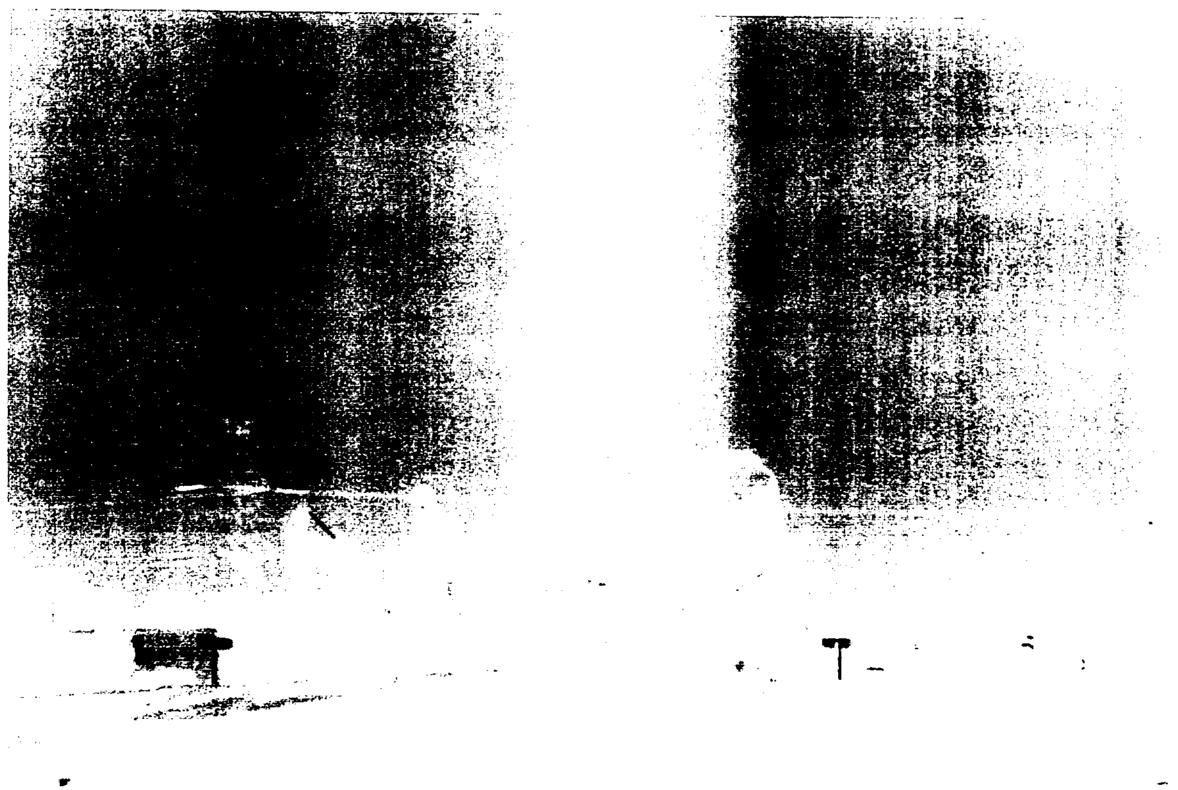
Sediment Removal



August 2001: Sediment removal near Cotton Wood Apartments.

SOLUTIA

View of the Containment Cell From Falling Springs Road



October 2001: Sediment Placement.

SOLUTIA

View From the Top of the Berm Wall Into the Containment Cell

November 2001: Sediment Placement.

SOLUTIA

Progress into 2002

Summer 2002: The Cell will be capped and the creek bed between Queeny to Judith will be lined.

SOLUTIA

Keeping People Informed

Creekside Commentary, Townhall Meetings, Local Journalism

SOLUTIA

Staying Accessible To People

Community Hotline

SOLUTIA

Questions

Exhibit 4

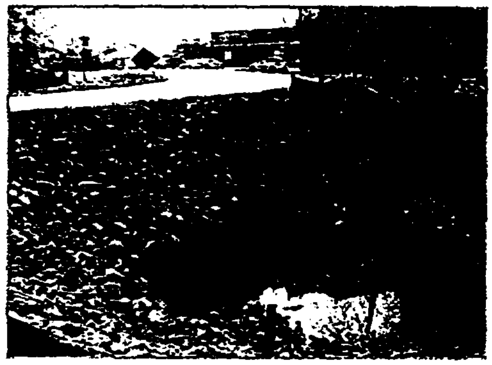
Creekside Commentary

Work Begins

Work has begun on the cleanup of Dead Creek. Here are a few of the things you may have noticed or will soon see:

Week of October 23: A USEPA Order issued to Solutia May 31, 2000 requires the removal of all sediments in Dead Creek and placement in an approved containment cell. The United States Environmental Protection Agency (USEPA) will oversee all work. In preparation for this work, a gravel lot was constructed on Judith Lane to accommodate two construction trailers and parking for workers. The two trailers will provide field offices for the USEPA, Maverick Construction Company and other field operations personnel.

October 23 through the end of November: Dewatering work begins on the creek. Dewatering means drying out the creek bed in preparation for removal of the sediments (creek bottoms). High Density Polyethylene (HDPE) pipe will be installed along the length of the creek, beginning with the area between Queeny Avenue and Judith Lane. The HDPE pipe will eventually extend to



Culvert work through late November.

the western side of Route 3. It will take several months to dry out the creek sediments. Once the sediments are dry, they will be removed and placed in the cell without the need for further drying.

Culvert work at Cargill Road through late November: This work will improve flow in the creek. You may have seen Cahokia police stationed near this work. Solutia is paying the Village of Cahokia to have off-duty police officers secure the area on Cargill Road due to the high volume of tractor-trailer traffic going to the river and the heavy construction equipment crossing the road on a frequent basis. Police officers also ensure the safety of residents by allowing only authorized personnel near the construction zone.

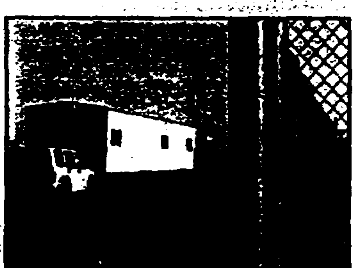
This is the first issue of "Creekside Commentary," a newsletter for residents of the Cahokia and Sauget area. Solutia's Krummrich Plant will publish this newsletter on a regular basis to keep you informed of the happenings in the area. If you have questions, concerns or comments, please contact Don Ridenhower at the Solutia Community Hotline Number, (618) 910-2332.

Sampling Completed

Water Main Break

In October, during excavation for the field construction parking lot on Judith Lane, workers broke a water main. The water district was unaware the main existed and had not marked it prior to construction.

The water district took full responsibility for the break and repaired the main promptly.



The project field construction lot on Judith Lane. Construction trailers will house the construction management company and the USEPA

Solutia has been part of this community for nearly 100 years. Many of Solutia's employees and their families live in this community. We want to be a good neighbor. That's why it's important to Solutia to work with the United States Environmental Protection Agency (USEPA) to clean up the area in an environmentally responsible way.

Solutia has agreed to work with the USEPA to remove sediments from Dead Creek, which runs through Sauget and Cahokia. Solutia is taking this project on alone, even though there are a number of other companies responsible for the environmentally affected sediments in the creek.

The schedule now calls for creek dewatering to begin in November, acquiring work plan approvals for the sediment excavation and cell construction in late November and then going out for bid on the project to build the 50,000 cubic yard containment cell for the creek sediments.

The cell will be located between Judith Lane and Queeny Avenue. Bid awards for the sediment excavation and cell construction should be made in early 2001, with the sediment excavation and cell construction beginning in early spring.

In addition to removal of the creek sediments, Solutia is studying other areas along the creek. Soil samples have been collected from 20 homes located along the creek or within close proximity to the creek within the study area.

Solutia has shared the data from these samples with the homeowners. Solutia supports USEPA's opinion with respect to these soil samples that "Preliminary results show no unsafe levels of metals, PCBs, or other contaminants associated with Dead Creek contamination."

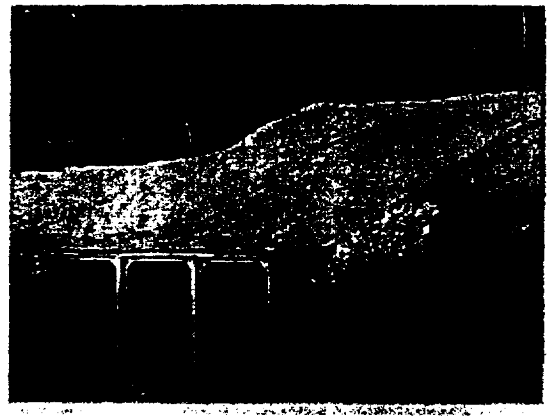
Ground water, surface water, creek sediment and air samples have also been collected in the area. The data has been sent to the USEPA. Solutia's experts will conduct a detailed analysis of the data, which should be completed by spring 2001. When approved by the USEPA, this data will be available in the Cahokia Public Library.

If you have questions or comments about any aspect of this project, feel free to contact Don Ridenhower at the Solutia Community Hotline number: (618) 910-2332.

Creekside Commentary

December 2000 · Issue 2

Activity Picks Up



To improve flow, new culverts were installed in the creek near Cargill Road.

Culvert work at Cargill Road: Work to improve flow in the creek near Cargill Road has been completed. Three 6-foot by 6-foot concrete culverts (pictured at right) were installed after this area of the creek was widened and deepened. These three culverts replace one 54-inch culvert.

Dewatering the creek: Activity to dewater the creek sediments began in November. The objective of this work is to dry the sediments over the next several months so that they can be placed into the completed containment cell without further drying. Workers are installing 12,000 feet of 12-inch High Density Polyethylene (HDPE) pipe along the banks of the creek from Queeny Avenue to the west side of Route 3.

The flexibility of the HDPE pipe allows it to be curved around trees and shrubs, so that damage to creekside vegetation is minimized. The picture on the back page illustrates one of the ways the vegetation along the creek bank is being protected.

The roadway at Judith Lane was cut to allow the HDPE pipe to go under the road. Kinder Street and Cahokia Street will also be cut during the process of pulling the pipe along the creek. After all three road cuts have been made and the pipe has been pulled under the roadway, the street cuts will be repaired with asphalt. Residents will be notified when street closings are required to accomplish any of this work. Once the pipe is completely installed, a pumping system will pump water from the creek into the pipe to be released downstream (beyond Route 3). It will then flow into the Mississippi River. The pumps operate automatically based on the water level and noise should be minimal. The pumping will not affect the water table (well water levels) since only stormwater will be pumped from the creek.

Access Locations: Access sites are being constructed at various locations along the creek. A large

[illegible]mentary is a newsletter for residents of the [illegible]
[illegible] Krummrich Plant publishes this newsletter on a [illegible]
[illegible]formed of the progress on the Dead Creek [illegible]
[illegible] the area. If you have questions, con[illegible]
[illegible] please contact Don Ridenhower at [illegible]
[illegible] Hotline Number: (618) 910-2332

Activity (continued from front page)

gravel access site has been constructed on the south side of Judith Lane. Smaller gravel sites have been or will be built at several locations further down the creek. These sites will be used as staging areas for the equipment used to pull pipe and/or remove sediment

View of creek from Cahokia Street access point.

from the creek and as parking sites for the trucks which will move the sediment to the containment cell.

Welding sites: Various sites, such as the Parks College parking lot on the west side of Falling Springs Road, are being used as temporary HDPE welding sites. The welding sites will change as the pipe is pulled further down the creek. The HDPE pipe must be welded together as the sections are pulled along the creek. Valves are also welded between sections of the pipe to allow the water flow to be temporarily diverted into retention basins.

Retention basins: Several temporary retention basins will be constructed in the creek. These basins will be used to capture water from a section of pipe that may be temporarily shut off to allow work in the creek. That water will then be allowed to settle before being released into the pipe.

A temporary fenced retention basin will be constructed west of Illinois Route 3. This basin will be utilized to contain water that will be forced through an existing culvert under Route 3. Over the years, this culvert has gotten clogged with mud and it must be cleaned out to allow the HDPE pipe to be pulled through. The retention basin will be fenced to ensure residents' safety due to the high volume and velocity of water required to clean out the culvert.

As flexible HDPE pipe is pulled down the creek by a backhoe, workers insert wooden boards between trees and the pipe to minimize damage to vegetation along the creek bank.

Creekside Commentary

Work Continues Throughout Winter

Installation of pipe along creek complete: Activity to dewater the creek sediments continued as workers completed installing 12,000 feet of 12-inch High Density Polyethylene (HDPE) pipe along the banks of the creek from Queeny Avenue to the west side of Route 3. This work was accomplished throughout the harsh winter weather in November and December.

Workers continue construction of pipeline along creek through snow and frigid weather in November and December 2000.

The objective of this work is to dry the sediments over the next several months so that they can be placed into the completed containment cell without further drying.

Cleaning culverts: Creek water flows through existing culverts under streets along the creek, under the Parks College parking lot, and under Route 157 and Route 3. Over the years, these culverts have gotten clogged with sediment. The HDPE pipe was inserted through some of the culverts before the sediment was removed. The culvert under the Parks College parking lot needed to be cleaned out before the pipe could be pushed through.

Construction of retention basin on west side of Illinois Route 3. The completed basin is surrounded by chain link fencing.

A water jet system was used to clean the culverts by injecting a high velocity stream of water into the culverts. In the cases where the pipe had already been inserted in the

...Commentary is a newsletter for residents of the Ca... ...Krummrich Plant publishes this newsletter on a reg... ...informed of the progress on the Dead Creek ... in the area. If you have questions, con... ...comments please contact Don Ridenhower at ...Community Hotline Number: (618) 910-2332.

[illegible]

The [illegible] removal of the sediments is completed.

The plan will be submitted for approval to the USEPA and the Illinois EPA. It will also be submitted to government agencies with an interest in natural resource restoration for their review and comment.

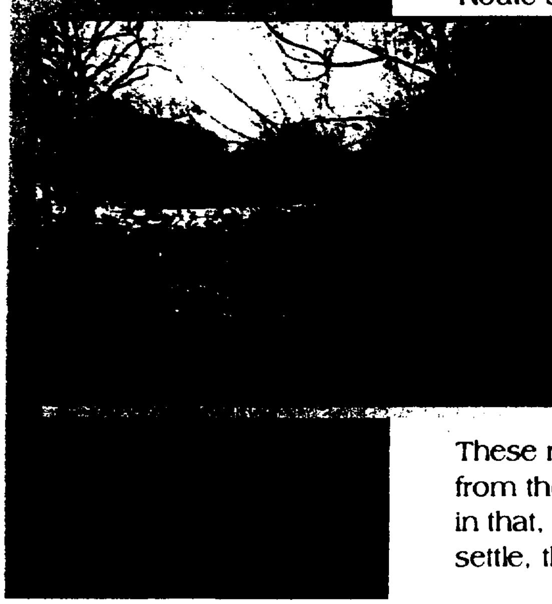
Work (continued from front page)

culvert, the sediment was flushed out by moving the pipe from side to side during the flushing process.

In the case of the culvert under the Parks College parking lot, the water and sediment forced out of the culvert flowed into a temporary retention basin which was built west of Illinois Route 3 (see picture on front page). This basin slowed the flow of water so that the sediment settled out before the water continued downstream. The basin is fenced to ensure residents' safety during the jet cleaning process.

New power pole installation complete: Ameren UE has installed new power poles and conduit along the creek. This source of electricity will be used to provide power to sump pumps along the creek to pump water out of retention basins.

Retention basins: In addition to the retention basin west of Route 3, several other temporary retention basins are being constructed in the creek at the head of each creek section. They will be used to capture water that would otherwise enter into that section. That water will then be allowed to settle before being pumped back into the pipe. These retention basins differ from the one built near Route 3 in that, after being allowed to settle, the water will actually be pumped back into the pipe to be carried downstream.



Ameren UE installs new power poles along creek to provide power to sump pumps in retention basins.

Sampling Results Now Available

The analytical results for the ground water, surface water, creek sediment and air samples taken last fall along the creek have been completed. A Data Report with a compilation of all analytical results was submitted to the United States Environmental Protection Agency (USEPA) on January 9, 2001.

This information (one large volume of scientific data) is now available for public review in the Cahokia Public Library. The next step in the process involves a rigorous analysis of the data to determine what, if any, human health or ecological concerns exist that will need to be addressed.

Creekside Commentary

March 2001 · Issue 1

Dewatering Begins!

Pumps Activated: After work crews completed laying the High Density Polyethylene (HDPE) pipe along the creek, constructing temporary retention basins and installing sump pumps, it was time to activate the pumps to begin dewatering the creek. The dewatering process will dry out the creek bed in preparation for removal of the sediments (creek bottoms).

Construction of retention basin at Judith Lane. Sediment removed to construct basin was placed on plastic and then sewn in black geotextile fabric and covered with a tarp to keep sediment contained until the removal process begins.

Once the creek beds have been dried, the creek sediments will be removed and placed into the containment cell, which will be constructed north of Judith Lane.

Completed retention basin at Judith Lane. Retention basins slow water down and permit sediment to settle out before being pumped into pipe to flow downstream.

Retention Basins: Construction of temporary retention basins in the creek was completed prior to startup of the pumps.

Retention basins were constructed at the entrance to each creek sector at the culverts.

Sediment removed at each culvert was placed on top of plastic sheeting and black geotextile fabric

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[illegible] formed of the progress on the Dead Creek [illegible]
[illegible] the area. If you have questions, con[illegible]
[illegible] please contact Don Ridenhower at [illegible]
[illegible] Hotline Number: (618) 910-2332.

Containment Cell

The next step in the clean... [illegible] ... will begin in spring 2001. [illegible]

... purposes ... States Environmental Protection Agency. More information will be provided in future issues.

Dewatering (continued from front page)

located next to each retention basin. The plastic was wrapped over the mound of sediment and the geotextile fabric was then wrapped around and sewn together to totally encapsulate the sediment pile. The sediment was then covered with canvas tarps or heavy plastic sheeting. This will keep the sediment intact and dry until the removal process begins.

Green power boxes provide power to the sump pumps. The black mound is a sediment pile covered with plastic, geotextile fabric and a tarp to keep the sediment intact and dry.

The retention basins are used to allow the sediment to settle out before the creek water flows downstream. Just downstream of each retention basin, a sump pump pumps the settled water into the HDPE pipe. The water in the pipe then travels downstream and empties back into the creek through a diffuser which is installed on the west side of Route 3.

Diffusers: A diffuser has been installed in the creek west of Illinois Route 3 *(pictured at right)*. Diffusers are used to reduce the velocity of water as it is released from the pipe into the creek.

Clearing debris: The next step in preparation for removing the creek sediment is clearing the stumps, logs and debris in the creek. This will make way for the construction equipment which will remove the sediment from the creek bottom and place it in tarpaulin-covered trucks to be hauled to the containment cell.

View of diffuser in creek bottom west of Route 3. Diffusers reduce the velocity of water as it is released from the pipe.

Creekside Commentary

April 2001 · Issue 5

Visible Progress

Dewatering Continues: Creek dewatering continues, with the pumps operating in automatic mode. Water will continue to be pumped out of the creek until sediment removal begins.

Brush Clearing: In mid-March, clearing of brush and debris began along the creek from Queeny Avenue to Judith Lane. Brush is being cleared from the creek bed and creek banks to allow a liner to be placed in this section of the creek. A liner will be located in this area because it is closest to the historical sources of the materials of concern that will be removed from the creek, and therefore is the most affected area. The liner is an extra precaution to prevent any exposure to the remaining subgrade soils that may also be marginally affected.

View of brush clearing along creek between Judith and Queeny. Clearing along the rest of the creek will not be as extensive.

The brush clearing will continue south along the creek until the entire length of the creek has been cleared. South of Judith Lane, the clearing will be contained to the creek bed and a few feet up the banks.

Once the brush is removed, it is placed in a chipper and the chips are then spread on the creek bank. Other debris and refuse found in the creek, such as tires or other discarded items, will then be removed, power washed and disposed of appropriately.

Completion of brush clearing and debris removal is dependent on the spring weather. Even with poor weather, the cleaning is expected to be completed by late spring.

Safety Fencing: Once each section of creek has been cleared, four-foot-high orange safety fencing will be installed along the creek banks, one foot above the high water mark. The safety

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[illegible]e area. If you have questions, co[illegible]
[illegible]ase contact Don Ridenhower a[illegible]
[illegible]otline Number: (618) 910-2332

More Progress

Construction of the base of the cell that will contain the creek sediments is estimated to begin in May. The cell will [illegible] near Judith Lane.

The base of the cell will [illegible] impermeable [illegible] secondary [illegible] leak [illegible] liner [illegible]

The cell design is [illegible] technology used at all commercial and private sites where containment of hazardous wastes is required. Sediment removal from the creek and placement in the cell is anticipated to begin in August or September 2001.

View from Cahokia Street of creek being dewatered. Covered sediment shown at right.

fencing will discourage people and animals from entering the creek beds while the drying process is continuing.

Archeologist Survey: An archeologist, employed by Environmental Compliance Consultants, is in the process of conducting a field survey along the creek and in the area near Judith Lane where the containment cell will be constructed.

The survey is being conducted in accordance with state and federal guidelines and is being performed to investigate any evidence of cultural material and/or historic artifacts and features in the creek or at the site of the containment cell.

The containment cell site investigation is completed. No historical artifacts were found during the investigation of the containment cell area.

Creek beds will be investigated in the next few weeks. In the event the archeological assessment finds anything of significance, Solutia will report the findings to the United States Environmental Protection Agency (USEPA). At that point, the USEPA and the State of Illinois will review the situation and take appropriate action.

Creekside Commentary

Creek Clean-up

Brush Clearing and Safety Fencing: As each section of the creek is cleared of brush and debris, orange fencing is being installed as a safety measure. The safety fencing acts as a physical barrier to discourage people and animals from entering the creek bed while the drying process continues. Trenches are dug through the center of the creek bed to maintain water flow.

View of powerwashing operation in the creek at Jerome Lane. All equipment used in the creek is powerwashed before it leaves the creek area to ensure that sediments remain in the creek. Orange safety fencing is visible in right foreground.

All workers in the creek exit through defined areas on the creek banks, wash off their boots and gloves and place their used coveralls in a container for appropriate disposal. All equipment in the creek is powerwashed before it leaves the creek area. These precautions are taken to ensure that creek sediments remain in the creek.

Staging areas are located in each creek section for the debris that must be removed, powerwashed and disposed of appropriately.

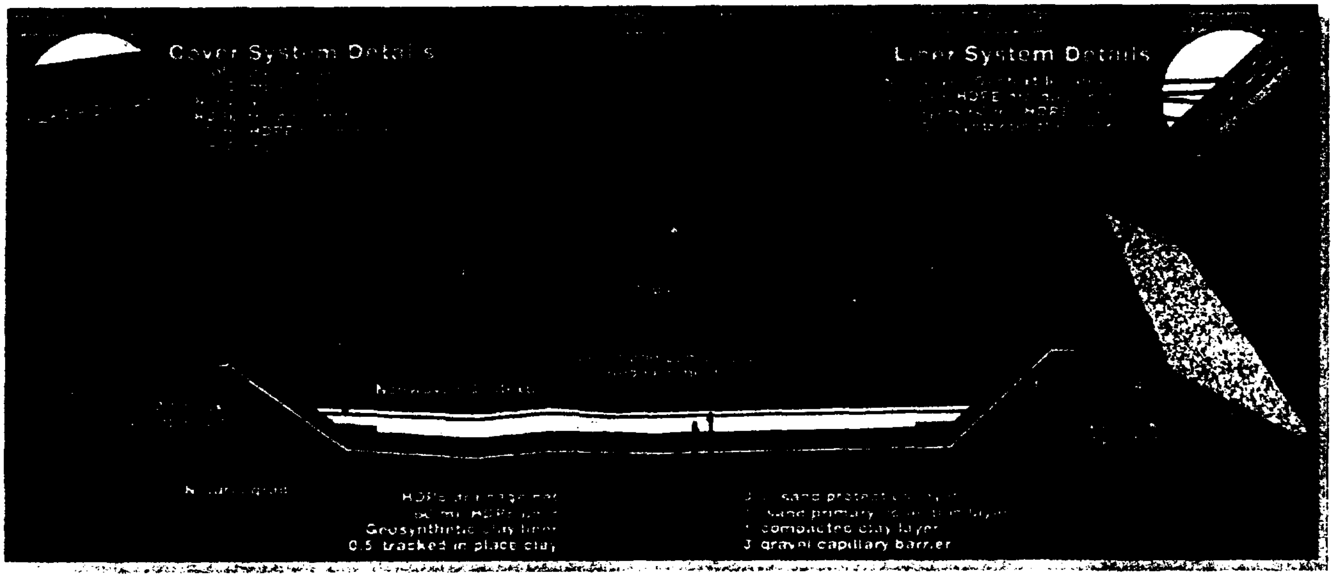
Cell Construction: Construction of the containment cell which will hold the creek sediments began in late April in a field along the creek near Judith Lane. The cell is being built by LMS of Madison, Indiana. Maverick Construction is providing construction management services on the project. Maverick worked with the Labor Management Committee of the Leadership Council Southwestern Illinois and local unions to coordinate the work force for this project.

The cell is being built under the oversight of the United States Environmental Protection Agency (USEPA). Kevin Turner is the USEPA on-scene coordinator.

Maverick Construction has hired an independent quality assurance contractor to be certain that LMS and its quality control department are following procedures and building the cell correctly.

[illegible]

Cell Construction



Cutout view of cell construction details. The base of the cell will be protected with commercial-grade impermeable primary and secondary liners, with a leak detection/collection system between the two liners.

Trailers housing the construction field offices and the USEPA project office are located on Judith Lane. To minimize disruption in the neighborhood during construction, crews are being transported to the work areas in a van rather than driving individually and a trailer is being staged at the work area so that crews can eat lunch without having to travel back to Judith Lane. As much as possible, equipment and materials are being dropped directly at the work areas to reduce traffic on Judith Lane; the cell area is watered down frequently to minimize dust; and Judith Lane (near the construction area) is cleaned nightly.

Topsoil in the cell area has been removed to reach the clay layer below, which provides a more stable base for compaction. Fill dirt is being hauled in to construct the berms (sides) of the containment cell. The cell base, liner system and berms must be built prior to receiving any sediment from the creek. Construction of the cell and sediments placement is estimated to continue through 2001 and be completed in early 2002.

As detailed in the cross section above, the base of the cell consists of over 6 feet of layered material, including gravel, compacted clay, geosynthetic clay liner, two layers of High Density Polyethylene (HDPE) liner, HDPE drainage net and sand. The berms of the cell will consist of compacted fill dirt 20 feet thick.

The liner system, which is contained within the base, consists of nonwoven geotextile fabric, two layers of HDPE drainage net, 2 layers of HDPE liner and a geosynthetic clay liner. A leak detection system is placed between the primary and secondary liners. In the unlikely event that the primary liner should leak, it will be detected and removed prior to any escape to the outside.

The cover system includes over 2 feet of layered material, including compacted fill, HDPE liner and drainage net, geotextile fabric and topsoil with vegetated cover (what you'll see on the outside of the cell).

After the sediment is placed in the cell and the cover system installed, regular maintenance will include pumping out liquid which will drain to an installed sump within the base of the cell. The amount of liquid to be removed will diminish with time as the compaction process squeezes residual liquids from the cell contents.

Creekside Commentary

Activity Increases

Two large trackhoes being used to excavate sediments from the pond at the end of Walnut Street.

Work in Creek: Installation of orange safety fencing along the entire length of the creek is complete. Trash (old tires, metal waste and scrap, etc.) and large logs have been collected in each section of the creek. The trash has been powerwashed once. As it is removed from the creek, it will be power-washed a second time and then placed in dumpsters. The dumpsters will then be removed for appropriate disposal. The logs will be chipped up and used for dust control.

All of this material is being collected in each section until the entire creek has been completed. Then the power-washing, trash removal and chipping operations will proceed down the creek. Removing all of the logs and trash at one time is less disruptive to the neighborhoods, and more efficient and cost-effective than bringing in the equipment several times.

Dewatering: The pond at the end of Walnut Street (near the Judith Lane construction site) is being cleared of trash and logs.

To drain the pond, the water is being pumped by several sump pumps into the creek between Judith Lane and Cahokia Street. Some of that water may flow further down the creek. This explains why some areas of the creek that had been fairly dry now contain water.

The pond sediments are being excavated using large trackhoes with scoops. The sediments are placed in a temporary holding area adjacent to the pond. This allows the sediments to dry and will speed up the process of placing the sediments in the

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…d of the progress on the Dead Creek
…the area. If you have questions, con-
…lease contact Don Ridenhower at
…Hotline Number: (618) 910-2332.

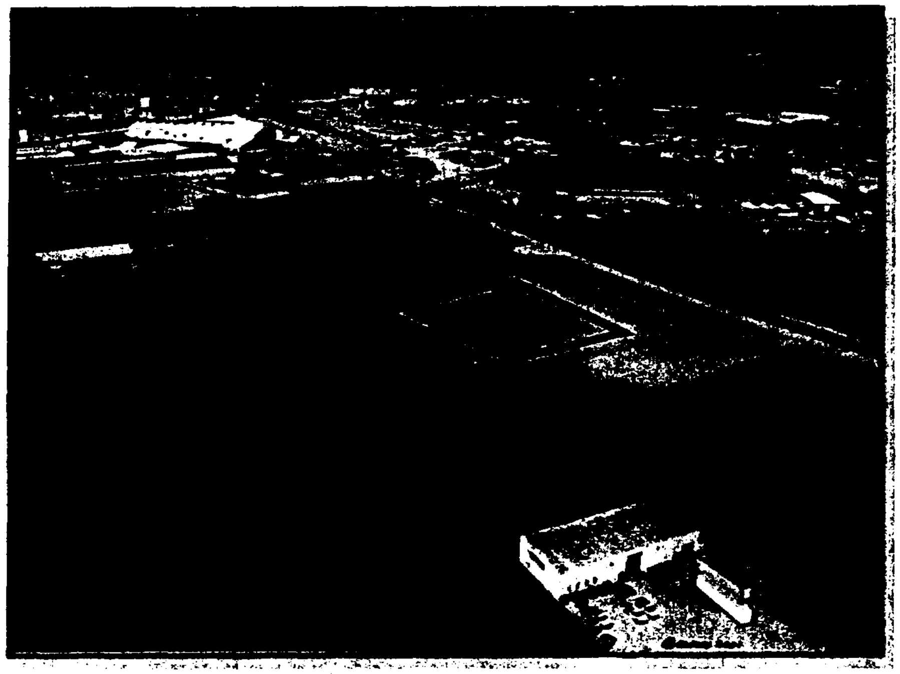
Cell Construction

For More Information

Call the Solutia Community Hotline at (618) [illegible]

You may also attend the Cahokia Town Hall meeting scheduled for

Tuesday, June 26, 2001
7 p.m.
Bethel United
Church of Christ
2200 Camp Jackson
Cahokia, Illinois



Aerial view of containment cell construction site from Judith Lane looking north to Queeny Avenue. The black box in the center indicates the area of the base of the cell. (Copyrighted photo by Srenco Photography.)

containment cell once construction is complete.

Cell Construction: The rains in early June put the cell construction on Judith Lane somewhat behind schedule. To catch up, workers have been working some Saturdays and 12 hour work days are the norm. Dump truck traffic in the area is controlled by an off-duty Cahokia Police officer paid by Solutia, who is stationed at the site during construction hours.

Efforts to reduce dust and noise in the area continue, including street cleaning, watering down the construction site throughout the work day, and transferring workers by van to work sites along the creek.

The aerial view pictured above shows the containment cell construction site. Kelly Tire on Judith Lane is in the bottom right portion of the photo. The black box in the center of the photo depicts the area of the base of the cell.

The base of the cell will consist of a multi-layered system of High Density Polyethylene (HDPE) liner, HDPE drainage net, gravel, clay, sand and geosynthetic clay liner. The liner system within the base will consist of layers of nonwoven geotextile fabric, HDPE drainage net, geosynthetic clay liner and HDPE liners, with a leak detection system between the primary and secondary liners.

All of this will be constructed between the ground and the sediments that will be placed in the cell. The cell berms (sides) will be constructed as the sediments are placed. The berms will extend outside the area of the black box in the photo above. Cell construction is expected to be completed this year.

Creekside Commentary

Construction Continues

Dewatering: Sediment removal from the pond at the end of Walnut Street should be completed by the end of July. The sediments are being placed in a temporary holding area adjacent to the pond to dry. Once the sediment is completely removed, the area will be graded and power seeded.

Twenty-nine turtles were removed from the pond, washed and relocated downstream. This turtle was in middle of pond; picture taken from bank of pond

All sediments placed in the temporary holding area will be screened to remove any sharp rocks, branches or foreign objects before being placed in the containment cell. These sediments will form the first layer in the cell and all sharp objects must be removed to ensure that the liner system is not punctured.

Turtle Relocation: Turtles removed from the pond at the end of Walnut Street during sediment removal were washed and then released into the creek downstream, beyond Route 3. Twenty-nine turtles of various sizes were relocated.

Dump truck dumping fill dirt on top of containment cell berm. Earth moving equipment places dirt and compacts it.

Cell Construction: Construction of the cell berms is nearing completion. This means a decrease in the dump truck traffic on Judith Lane, since most of that traffic was due to hauling fill dirt for berm construction.

Excavation of soil in the field north of Walnut Street and west of Falling

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... Hotline Number: (618) 910-2332.

Sediment Removal

Springs is for use in slope stabilization associated with the sediment removal from the pond at the end of Walnut Street. Once soil excavation is concluded, estimated to be by the end of July, grading and power seeding will be completed.

During July, construction will begin on the cell liner system.

Storm Water Drainage and Treatment System: Since the cell will be open to the elements during sediment placement, a drainage system will be built to collect and store rainwater which has come into contact with those sediments. The water will then be treated before being released into the HDPE by-pass piping, discharging downstream.

Dump trucks, like the yellow one above, will transport sediment from the creek to the containment cell.

Work in Creek: In mid to late July, dump trucks, like the one pictured at right, will begin removing stockpiled sediments from creek sections and transporting them to the temporary holding area near the Judith Lane construction site.

These stockpiled sediments are located at Judith Lane, Cahokia Street, Kinder Street, Jerome Lane, Edgar Street and Parks College.

Stockpiled sediment shown in left foreground. Workers in disposable coveralls work in creek.

The stockpiles were created by construction of the retention basins at the entrance to each creek section. The stockpiles have been covered with black geotextile fabric and covered with tarps to keep the sediments contained and as dry as possible.

Trackhoes will be used to load the stockpiled sediment into the trucks. Each truck will be loaded, covered and checked before transporting the sediments. If sediment is found on the outside of a truck, it will be cleaned before leaving the creek. The trucks will be using the side streets and Falling Springs Road to reach the Judith Lane site.

Sediment Removal in Culvert Pipes: Also in mid to late July, workers will begin removing sediments from culvert pipes under Route 157 (from the south side of Cottonwood Apartments to the "wedge" at Route 3 and 157) and from the wedge west under Route 3.

Workers will wear disposable coveralls, gloves and boots while working in the area, just as they do while working in the creek. When actively working with the sediments, they will wear respirators. To clean the culverts, they must crawl in the pipe and use a vacuum hose attached to a truck to remove the sediments.

Creekside Commentary

August 2001 · Issue [illegible]

Special Judith Lane Issue

Several residents have asked questions about the truck traffic on Judith Lane. This issue will answer those questions.

Why can't these trucks use Route 3? The *maximum* speed of the trucks is 30 miles per hour; many times they must drive slower than that. The speed limit on Route 3 (which is a state highway) is 45 miles per hour. We're not permitted to take the trucks on Route 3 because they would impede traffic and pose a safety hazard. Falling Springs is our only available access route to the Judith Lane containment cell site.

Why can't the trucks use the gravel access area along the creek from Queeny Avenue? That temporary access area is not built for this type of truck traffic. In addition, USEPA would prefer we not cross this area.

How long will this be going on? We project that the trucks will be transporting sediment from the creek through the end of the year. Work will continue on the containment cell after that time, but the sediment removal is expected to be complete by then. The project is contingent on the weather, so this is our best estimate at this time.

Trackhoe loads sediment from creek into dump truck for transport to Judith Lane construction site.

Are the trucks tearing up our street? No. Because of their large tires, the weight of the truck is distributed over a much larger area than normal. The pressure on the pavement in terms of pounds per square inch is less than that of a normal automobile.

We ask for your patience as we continue the process of removing the sediments from the creek. We understand this is an inconvenience to our neighbors. Solutia is doing its best to keep the inconvenience this project may be causing to a minimum.

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[illegible] of the progress on the Dead Creek [illegible]
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[illegible] please contact Don Ridenhower at
[illegible] Hotline Number: (618) 910-2332.

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Creekside Commentary

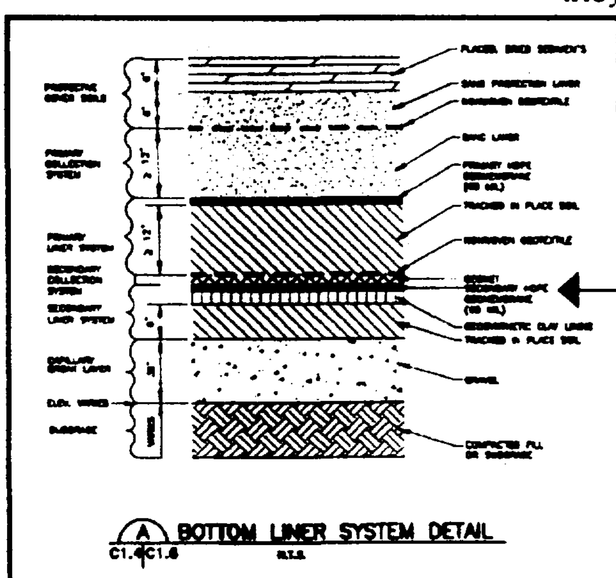
August 2001 - Issue 9

Construction Progresses

Cell Construction: The lining system is currently being installed in the cell. The picture at right shows two of the layers. The white layer is the geosynthetic clay lining, a man-made material which is equivalent to one foot of compacted clay. The black layer in the far right of the picture is the secondary High Density Polyethylene (HDPE) geomembrane. Once the materials are unrolled into place, they are heat-sealed where they overlap, in order to form a more protective barrier.

A construction worker (at left in white) and a quality control inspector (in black) stand inside the containment cell. White geosynthetic clay liner and black secondary HDPE geomembrane are shown within the cell.

The engineering drawing at left depicts the many layers which will be included in the completed liner system. The numbers down the left side of the drawing indicate the depth in inches of each material listed down the right side of the drawing. Construction has reached the secondary HDPE geomembrane, which is about the midway point of the layers (indicated by the red arrow).



Engineering drawing of liner system detail. Construction is currently at the point shown by the red arrow.

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Sediment Removal

August 2001 · Issue 9

There are full-time quality control inspectors on site to assure that construction follows design standards. The United States Environmental Protection Agency and the Illinois Environmental Protection Agency will approve the cell construction before placement of any sediment occurs, to insure that construction has met the rigorous design specifications.

Sediment Removal: Sediment removal from the pond at the end of Walnut Street is complete. The slope stabilization work performed as part of that excavation created a sloped area, which has been seeded. The resulting grassy area will act as a storm water retention area, with twice the capacity of the previous site.

Dump truck being loaded with sediment behind Cottonwood Apartments. Trucks are lined with polyethylene before sediments are placed inside. An auto tarp on the truck is pulled over the top to contain the sediments while on the route to the containment cell area.

Sediment removal is complete from the area behind Cottonwood Apartments and in the grassy wedge at Routes 3 and 157. The sediment was removed from the culverts using a vacuum truck and placed in the temporary holding area near the containment cell site.

Trackhoe turning over sediment in temporary holding area, to speed up drying of the sediments.

The photo at left shows a trackhoe turning over the sediment in the temporary holding area. This is done on a regular basis to speed up the drying process.

The photo above right shows one of the large dump trucks being loaded with sediment from the creek behind Cottonwood Apartments. The small trackhoe in the creek (shown at left in the above photo) excavates the sediment and places it in piles. The large trackhoe then picks the sediment up from the piles and places it in the dump truck. Polyethylene lines the truck bed and is also placed on the ground between the trackhoe and the dump truck to capture any sediment which might fall out of the bucket during loading.

Once the truck is 3/4 full, the auto tarp roller on top of the truck is activated. It pulls a tarp over the top of the sediment to keep it contained en route to the temporary holding area.

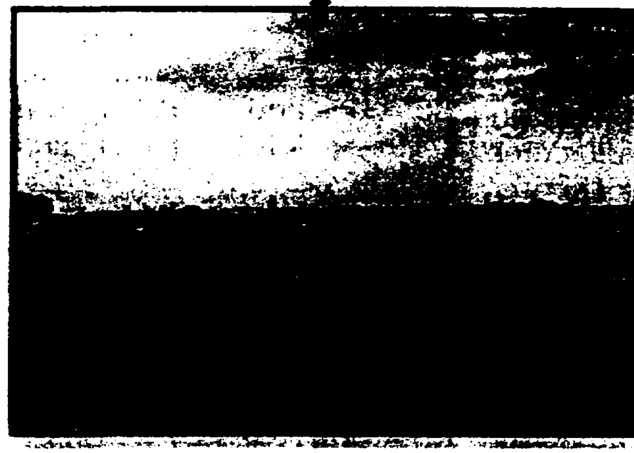
When school begins, the dump truck schedules will be coordinated to avoid school bus routes before and after school. This will minimize the dump trucks traveling in the same area as the school busses while children are entering and exiting the busses.

October 2001 - Issue 10

Creekside Commentary

Cell Liner Complete

Cell Construction: Installation of the multi-layered containment cell lining system is complete. On September 24, the United States Environmental Protection Agency (USEPA) and the Illinois EPA granted approval of the cell installation as consistent with the approved design. Sediments began to be placed in the cell on September 26.



View of inside the containment cell. Lining system is now complete. Black geotextile fabric is on sides of cell with protective sand layer in bottom. Sediment will be placed on top of the sand.

The exterior slopes of the cell have been powerseeded to prevent erosion during the filling stage. Yet to come is a layer of large rock called riprap which is used to permanently protect the slopes of the cell.

Screening Sediment: Sediment from the temporary holding area that will form the initial layer in the cell is being screened to remove any sharp rocks, branches or foreign matter. All sharp objects must be removed from the sediments to be placed nearest the interior cell liner to protect the integrity of the liner system.

Trackhoes turning sediments from the temporary holding area to aid in drying. The blue tanks in the background are part of the temporary storm water collection and filtering system.

Sediment Removal: Approximately 50 percent of the sediments have been removed from the creek. Workers have completed sediment removal from Jerome Lane

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Sediment Removal

south. Sediment removal work has now begun in the creek between Queeny Avenue and Judith Lane, and from Jerome Lane north towards Kinder Street.

Above: "Before" photo of creek with piles of debris and refuse.
At right: "After" photo of creek. Sediments and debris have now been removed from this section of the creek (view from Edgar Street looking north).

The sediment in the lower portion of the creek was removed first for several reasons. There is a smaller amount of sediment in the lower portion of the creek. It is more difficult to remove and requires the longest amount of travel time in the trucks. Because the containment cell was not ready to receive sediments, it was determined this sediment could be removed and placed in the temporary holding area to dry before being placed in the cell. This allowed the project to stay on target for completion of sediment removal by year's end. All water in the creek is bypassing these cleaned areas, thus avoiding any possibility of recontamination before the upstream segments are cleaned.

Removal of the debris and refuse piles in the creek is being scheduled as rainy day work when it is too wet for workers to enter the creek. The debris can be removed from the creek using equipment stationed on the banks or at the temporary access areas.

Storm Water Management: A temporary storm water collection and treatment system has been built to manage all storm water which comes into contact with the sediments while they are being placed in the cell. The water will be clarified, filtered and treated with activated carbon before being released into the bypass piping, discharging downstream.

Judith Lane: The county laid an oil and chip road surface on Judith Lane and Falling Springs Road, completely unrelated to the cell construction project. This new road surface has created gravel dust. To minimize the dust from truck traffic going into and out of the Judith Lane construction site, workers periodically water down Judith Lane from the construction site to Falling Springs.

Construction Schedule: Construction work and sediment removal work is currently operating six days a week on a 12 hours a day schedule. Placement of sediment into the cell is estimated to continue into January.

After all sediments have been placed, installation of the cell cover system will begin. Total project completion is estimated for second quarter of 2002.

Exhibit 5

14 9709

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

IN THE MATTER OF:	)	Docket No.: V-W-99-C-554
	)	
Sauget Area 1 Superfund Site	)	
Sauget and Cahokia, Illinois	)	AMENDED ADMINISTRATIVE ORDER
	)	PURSUANT TO SECTION 106(a)
	)	OF THE COMPREHENSIVE
	)	ENVIRONMENTAL RESPONSE,
Respondents:	)	COMPENSATION, AND
	)	LIABILITY ACT OF 1980,
Monsanto Company and	)	AS AMENDED, 42 U.S.C.
Solutia, Inc.	)	SECTION 9606(a)
	)	

I. JURISDICTION AND GENERAL PROVISIONS

This Order is issued pursuant to the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. § 9606(a), and delegated to the Administrator of the United States Environmental Protection Agency ("EPA") by Executive Order No. 12580, January 23, 1987, 52 Federal Register 2923, and further delegated to the Regional Administrators by EPA Delegation Nos. 14-14-A and 14-14-B, and to the Director, Superfund Division, Region 5, by Regional Delegation Nos. 14-14-A and 14-14-B.

This Order pertains to segments of Dead Creek and Site M, which are parts of a larger Superfund Site known as Sauget Area One. The Sauget Area One Site is currently the subject of a separate Administrative Order by Consent (AOC) signed by EPA and Solutia, Inc. and Monsanto Company on January 21, 1999, requiring a detailed Remedial Investigation and Feasibility Study (RI/FS) and Engineering Evaluation/Cost Assessment (EE/CA) of the Site. Dead Creek is approximately 3.5 miles long and flows southward through Sauget and Cahokia and empties into the Old Prairie du Pont Creek, which flows approximately 2,000 feet west into a branch of the Mississippi River known as the Cahokia Chute. Specifically, this Order pertains to Sauget Area One Dead Creek Segments (CS) B, C, D, E, the portion of F from Route 157 to the Terminal Railroad Association embankment to the eastern edge of the Borrow Pit Lake as depicted in Exhibit 3 attached hereto (hereinafter referred to as a "portion of F"), and the basin area located at the lift station adjacent to the levee as well as to site M, located within Sauget and Cahokia, St. Clair County, Illinois (the "Site"(see map attached as Exhibit 1)). It requires the emergency removal of contaminated sediments and soils from certain locations in and around Dead Creek. The Order also requires installation of a 40 millimeter (mil) high density polyethylene (HDPE) liner in CS-B and post removal sampling in all excavated areas. The post removal sampling results will be used in the Area One EE/CA and RI/FS processes to determine what, if any, excavated areas in addition to CS-B may require further remediation under the EE/CA process. Sediments and soils to be removed under this Order are required to be properly disposed of in a Resource Conservation and Recovery Act (RCRA)-compliant Containment Cell ("Containment Cell") located adjacent to CS-B. In addition to the requirements set forth in this Order concerning the construction, operation and maintenance of the containment cell, any necessary additional requirements associated with the long term operation and maintenance of the cell will be considered and addressed in the EE/CA and/or RI/FS processes for the Site. This Order supplements the Unilateral Administrative Order issued on June 21, 1999, to Monsanto and Solutia requiring investigation and repair of Dead Creek culverts in the Cahokia and Sauget areas. Dead Creek segments B (and the area adjacent to CS-B upon which the Containment Cell is to be located), C, D E, a portion of F, and the basin area located at the lift station, as well as Site M comprise the "Site" for the purposes of this Order. This Order requires the Respondents to conduct removal activities described herein to abate a potential imminent and substantial endangerment to the public health, welfare or the environment that may be presented by the actual or threatened release of hazardous substances at or from the Site.

EPA has notified the State of Illinois of this action pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

II. PARTIES BOUND

This Order applies to and is binding upon Respondents and Respondents' heirs, receivers, trustees, successors and assigns. Any change in ownership or corporate status of Respondents including, but not limited to, any transfer of assets or real or personal property shall not alter such Respondents' responsibilities under this Order. Respondents are jointly and severally liable for carrying out all activities required by this Order. Compliance or noncompliance by one or more Respondent with any provision of this Order shall not excuse or justify noncompliance by any other Respondent.

Respondents shall ensure that their contractors, subcontractors, and representatives comply with this Order. Respondents shall be responsible for any noncompliance.

III. FINDINGS OF FACT

Based on available information, including the Administrative Record in this matter, EPA hereby finds that:

1. Dead Creek has historically been a repository for local area wastes. On December 21, 1928, an easement agreement between local property owners and representatives of local business, municipal and property interests was executed to "improve the drainage in that District (Dead Creek) by improving Dead Creek so as to make it suitable for the disposal of wastewater, industrial waste, seepage and storm water." Thereafter, Dead Creek systematically received direct and indirect discharges from local businesses and the municipality for many years.

2. Information on the types of wastes disposed of and the types and levels of contamination found at the Sauget Area One Site, including wastes and contamination found in Dead Creek, have been provided to EPA from various sources including, but not exclusively

from: 1) CERCLA 103 (c) Submittals; 2) CERCLA 104(e) Responses; 3) Expanded Site Investigation Dead Creek Project Sites (E&E, 1988); 4) Removal Action Plan for Dead Creek Sites (Weston-SPER, 1987); 5) Description of Current Situation at the Dead Creek Project Sites (E&E, 1986); 6) Site Investigations for Dead CS-B and Sites L and M (Geraghty & Miller, Inc. 1992); 7) Site Investigation/Feasibility Study for Creek Segment A (Advent Group, 1990); 8) Preliminary Ecological Risk Assessment for Sauget Area 1, Creek Segment F (E&E 1997); 9) EPA Removal Action Report for Site G (E&E 1994); 10) Area One Screening Site Inspection Report; and 11) Site Investigation Feasibility Study for CS-A (Avendt Group 1990).

3. Dead Creek stretches from the Alton & Southern Railroad at its northern end and flows south through Sauget and Cahokia for approximately 3.5 miles before emptying into the Old Prairie du Pont Creek, which flows approximately 2,000 feet west into a branch of the Mississippi River known as the Cahokia Chute. For sampling purposes, Dead Creek is subdivided into six separate segments labeled CS-A through CS-F. The segments are further described as follows:

CS-A is the northernmost segment of the creek and it is approximately 1,800 feet long and 100 feet wide running from the Alton & Southern Railroad to Queeny Avenue. This segment of the creek originally consisted of two holding ponds which were periodically dredged. For several years, CS-A and available downstream creek segments (e.g., ones that were not blocked off) received direct wastewater discharges from industrial sources and served as a surcharge basin for the Village of Sauget (formerly Village of Monsanto) municipal sewer collection system. When the system became backed up or overflowed, untreated wastes from industrial users of the sewer system were discharged directly into CS-A. On several occasions, CS-A was dredged and contaminated sediments were disposed of onto adjacent property (Site I of Sauget Area One Site). In 1968, the Queeny Avenue culvert, which allowed creek water to pass from CS-A to CS-B, was permanently blocked by the Village of Sauget. Remediation work was conducted by Cerro Copper in CS-A in 1990. Approximately 27,500 tons of contaminated sediments were excavated and sent to Resource Conservation and Recovery Act ("RCRA") and Toxic Substances Control Act ("TSCA") permitted facilities. CS-A is now filled and covered with crushed gravel and is not subject of this Order. Land use surround CS-A is industrial.

CS-B extends for approximately 1,800 feet from Queeny Avenue south to Judith Lane. Sites G, L, and M of the Sauget Area One Site border this creek segment. Land use surrounding CS-B is primarily commercial with a small residential area near the southern end of this segment. Agricultural land lies to the west of the creek and south of Site G. At some point after 1943, the Judith Lane culvert, which allowed creek water to pass from CS-B to CS-C, was blocked.

CS-C extends for approximately 1,300 feet from Judith Lane south to Cahokia Street. Land use is primarily residential along both sides of CS-C.

CS-D extends for approximately 1,100 feet from Cahokia Street to Jerome Lane. Land use is primarily residential along both sides of CS-D.

CS-E extends approximately 4,300 feet from Jerome Lane to the intersection of Illinois Route 3 and Route 157. Land use surrounding CS-E is predominantly commercial with some mixed residential use. Dead Creek temporarily passes through corrugated pipe at the southern end of CS-E.

CS-F is approximately 6,500 feet along and extends from Route 157 to the Old Prairie du Pont Creek. CS-F is the widest segment of Dead Creek and a large wetland area extends several hundred feet out from the both sides of the creek.

Site M: Located along the eastern side of Dead Creek CS-B (south of Site L) at the western end of Walnut Street in the Village of Cahokia. Site M was originally used as a sand borrow pit (dimensions = 220 feet by 320 feet) in the mid to late 1940's. The pit is hydraulically connected to Dead Creek through an eight-foot opening at the southwest portion of the pit. On information and belief, wastes from CS-B have in the past and potentially continue to migrate into Site M via this connection. The site is currently fenced.

4. Sediment and surface water samples collected by EPA and the Illinois Environmental Protection Agency (Illinois EPA) have detected a wide variety of organic and inorganic contaminants in each of the creek segments:

CS-B: Elevated levels of volatile organic compounds ("VOCs") and semi-volatile organic compounds ("SVOCs") were detected in sediments samples collected from CS-B such as benzene (87 parts per billion ("ppb")), toluene (810 ppb), chlorobenzene (5,200 ppb), ethylbenzene (3,600 ppb), trichlorobenzene (3,700 parts per million ("ppm")), dichlorobenzene (12,000 ppm), chloronitrobenzene (240 ppm), xylenes (540 ppm), 1,4-dichlorobenzene (220,000 ppb), 1,2-dichlorobenzene (17,000 ppb), phenanthrene (15,000 ppb), fluoranthene (11,000 ppb), pyrene (13,000 ppb). Elevated levels of PCBs exist within CS-B at levels as high as 10,000 ppm. Elevated levels of metals were also detected in sediments in CS-B including arsenic (6,000 ppm), cadmium (400 ppm), copper (44,800 ppm), lead (24,000 ppm), mercury (30 ppm), nickel (3,500 ppm), silver (100 ppm), and zinc (71,000 ppm).

Surface water samples collected from CS-B revealed elevated concentrations of VOCs such as chloroform (27 ppm), 1,1-dichloroethene (3 ppb), toluene (20 ppb), and chlorobenzene (33 ppb). SVOCs detected in surface water included phenol (28 ppb), 2-chlorophenol (14 ppb), 1,4-dichlorobenzene, 2-methylphenol (4 ppb), 4-methylphenol (35 ppb), 2,4-dichlorophenol (150 ppb), naphthalene (8 ppb), 3-nitroaniline (9 ppb), and pentachlorophenol (120 ppb). Pesticides were also detected in surface water samples including dieldrin (.18 ppb), 4,4-DDT (.24 ppb), 2,4-D (47 ppb) and silvex (3.4 ppb). An elevated level of PCBs (aroclor 1260) was also detected in the surface water of CS-B at a level of 44 ppb. Elevated levels of metals were detected in surface water such as aluminum (9,080 ppb), barium (7,130 ppb), arsenic (31 ppb), cadmium (25 ppb), chromium (99 ppb), copper (17,900 ppb), lead (1,300 ppb), mercury (8.6 ppb), nickel (1,500 ppb), and zinc (10,300 ppb).

CS-C: Elevated levels of VOCs and SVOCs were detected in sediments in this segment of Dead Creek including fluoranthene (4,600 ppb), pyrene (4,500 ppb), benzo(a)anthracene (3,300 ppb), chrysene (4,400 ppb), benzo(b)fluoranthene (7,500 ppb), benzo(a)pyrene (4,500 ppb), indeno(1,2,3-cd pyrene (4,300 ppb), benzo(g,h,l) perylene (1,500 ppb), dibenzo(a,h)anthracene (4,000 ppb), and 4-methyl-2-pentanone (1,200 ppb). PCBs (total) were also detected in sediments from CS-C at a maximum concentration of 27,500 ppb. Sediment samples also revealed elevated levels of metals such as copper (17,200 ppm), lead (1,300 ppm), nickel (2,300 ppm), zinc (21,000 ppm) and mercury (2.81 ppm)

Surface water samples collected from creek segment CS-C revealed elevated levels of metals such as lead (710 ppb), mercury (1.9 ppb), and nickel (83 ppb).

CS-D: Elevated concentrations of VOCs and SVOCs were detected in sediment samples collected from CS-D including 4-methyl-2-pentanone (1,200 ppb), benzo(b)fluoranthene (500 ppb), indeno(1,2,3-cd)pyrene (310 ppb), and dibenzo(a,h)anthracene (360 ppb). PCBs (total) were detected in sediments at a maximum concentration of 2,000 ppb. Elevated concentrations of metals were also detected such as cadmium (42 ppm), copper (1,630 ppm), lead (480 ppm), mercury (1 ppm), and zinc (6,590 ppm).

Surface water samples collected from CS-D revealed elevated concentrations of metals such as cadmium (8.1 ppb), lead (89 ppb), and nickel (189 ppb).

CS-E: Elevated concentrations of VOCs and SVOCs were detected in sediment samples collected from CS-E including chlorobenzene (120 ppb), pyrene (5,300 ppb), benzo(b)fluoranthene (2,400 ppb), and chrysene (2,800 ppb). Elevated levels of PCBs (total) were also detected at a maximum concentration of 59,926 ppb. Elevated levels of metals were also detected in the sediments of CS-E including cadmium (23.1 ppm), copper (8,540 ppm), lead (1,270 ppm), mercury (1.53 ppm), nickel (2,130 ppm), and zinc (9,970 ppm).

CS-F: Elevated concentrations of VOCs and SVOCs were detected in the sediments of CS-F such as toluene (29 ppb), 4-methylphenol (1,100 ppb), fluoranthene (310 ppb), and pyrene (340 ppb). Pesticides were also detected in the sediments such as 4,4-DDE (97 ppb), endrin (66 ppb), endosulfan II (203 ppb), and methoxychlor (8 ppb). PCBs (total) were also detected in sediments at a maximum concentration of 5,348 ppb. Elevated levels of metals were also detected in the sediments such as arsenic (276 ppm), lead (199 ppm), mercury (.55 ppm), cadmium (23.5 ppm), copper (520 ppm) nickel (772 ppm) and zinc (4,520 ppm). Elevated concentrations of dioxins were also detected in sediments in CS-F at a maximum concentration of 211 picograms per gram.

Site M: Originally constructed as a sand borrow pit in the mid to late 1940's, this pit is approximately 59,200 square feet in size and previous investigations indicate that approximately 3,600 cubic yards of contaminated sediments are contained within the pit. It is estimated that the pit is approximately 14 feet deep and it is probable that there is a hydraulic connection between this pit water and the underlying groundwater. Surface water samples collected from Site M revealed elevated levels of VOCs such as chloroform (27 ppb), toluene (19 ppb) and chlorobenzene (33 ppb). SVOCs detected in surface water included phenol (28 ppb), 2-chlorophenol (14 ppb), 2,4-dimethyl phenol (13 ppb), 2,4-dichlorophenol (150 ppb), and pentachlorophenol (120 ppb). Pesticides detected in surface water include dieldrin (0.18 ppb), endosulfan II (.06 ppb), 4,4-DDT (0.24 ppb), 2,4-D (47 ppb) and 2,4,5-TP (Silvex) (3.4 ppb). PCBs were also detected in surface water at a maximum level of 0.0044 ppb.

Sediment samples collected from Site M revealed elevated levels of VOCs such as 2-butanone (14,000 ppb), chlorobenzene (10 ppb) and ethyl benzene (0.82 ppb). SVOCs detected in sediments included 1,4-dichlorobenzene (40 ppm), 1,2-dichlorobenzene (26 ppm), 1,2,4-trichlorobenzene (14 ppm), pyrene (27 ppm), fluoranthene (21 ppm), chrysene (12 ppm), and benzo(b)fluoranthene (15 ppm). Total PCB levels were detected as high as 1,100 ppm. Elevated levels of metals were also detected in sediments at Site M, including antimony (41.2 ppm), barium (9,060 ppm), cadmium (47.2 ppm), copper (21,000 ppm), nickel (2,490 ppm), silver (26 ppm), zinc (31,600 ppm), lead (1,910 ppm), arsenic (94 ppm) and cyanide (1.3 ppm).

5. On information and belief, parties which generated wastes which were disposed of, released into and/or transported wastes to the Sauget Area One Site (including parties whose wastes migrated from various disposal areas into other Sites or segments of Dead Creek) include but are not limited to the following:

CS-A: Monsanto Company/Solutia, Incorporated; Cerro Copper Products Company; Amax Zinc Corporation; Mobil Oil Corporation; Ethyl Petroleum; Rogers Cartage; Sterling Steel Casting Co.; Darling Fertilizer, the Village of Sauget; Cardinal Construction Company; and Olin Corporation. CS-B: Monsanto Company/Solutia, Incorporated; Midwest Rubber Reclaiming (Division of Empire Chemical Incorporated) and Midwest Rubber Trustees Stanley Keitman, Richard M. Cohen, and Morris Weissman; Cerro Copper Products Company; Mobil Oil Corporation; Rogers Cartage Co.; Sterling Steel Casting Co.; Darling Fertilizer; Ruan Transportation Corporation; and Waggoner & Company; Industrial Salvage Disposal, Inc.; Sauget and Company; Paul Sauget; and Olin Corporation.

CS-C, D, E, OR F: Monsanto Company/Solutia, Incorporated; Cerro Copper Products Company; Mobil Oil Company; Amax Zinc Corporation; Midwest Rubber reclaiming (Division of Empire Chemical Incorporated) and Midwest Rubber Trustees Stanley Keitman, Richard M. Cohen, and Morris Weissman; Ruan Transportation Corporation; Rogers Cartage Co.; Sterling Steel Casting Co.; Darling Fertilizer; and Waggoner & Company; Industrial Disposal, Inc.; Sauget and Company; and Paul Sauget.

Site M: Monsanto Corporation/Solutia, Incorporated; Waggoner & Company; and Ruan Transportation; Mobil Oil Corporation; Cerro Copper Products, Inc.; Midwest Rubber Reclaiming (Division of Empire Chemical Incorporated) and Midwest Rubber Trustees Stanley Keitman, Richard M. Cohen, and Morris Weissman.

6. On January 21, 1999, EPA, Solutia and Monsanto entered into to an AOC pursuant to CERCLA Sections 104, 107 and 122 to conduct an RI/FS and EE/CA to investigate the nature and extent of contamination at the Sauget Area One site and develop and evaluate potential remedial alternatives. Work under that AOC is currently on-going.

7. Several of the culverts on Dead Creek are inadequately sized, blocked or partially blocked with debris and thereby cause storm water in Dead Creek to back up behind these culverts and, at times, overflow into surrounding residential areas.

8. Dead Creek and the areas surrounding the Creek are located within an area known as the American Bottoms which is the flood plain for the Mississippi River. The water table in this area is very close to the ground surface and during storm events the soils quickly become saturated. During these same storm events, water backing up behind blocked or inadequately sized culverts in Dead Creek overflows and increases the severity of flooding conditions for nearby residents in Sauget and Cahokia. Contaminants, including hazardous substances, in surface water, sediments, and surrounding soils may migrate via the overflow and flood waters onto the properties of neighboring residents.

9. In the summer of 1999, Solutia undertook a hydraulic study of the flooding problems related to Dead Creek. That study concluded that removal of sediments and debris from blocked and inadequately sized culverts would not provide a long term reduction of Dead Creek's flooding of residential areas and the associated risks from the migration of contaminated sediments.

10. Dead Creek sediments and soils are the major potential source of contamination in Dead Creek flood waters. Contaminated creek sediments and soils must be removed as soon as possible to eliminate the imminent and substantial threat of exposure to the contamination via direct contact by nearby residents and via flooding from Dead Creek. Preliminary ecological assessment data also indicates significant damage to aquatic organisms in Dead Creek.

11. The removal action required under this Order is consistent with the remedial action to be taken pursuant to the January 21, 1999, RI/FS AOC.

IV. CONCLUSIONS OF LAW AND DETERMINATIONS

Based on the Findings of Fact set forth above, and the Administrative Record supporting these removal actions, EPA determines that:

1. Dead Creek and the impacted areas adjacent to Dead Creek is a "facility" as defined by Section 101(9) Of CERCLA, 42 U.S.C. § 9601(9).

2. The substances described in Section III, paragraph 4 are "hazardous substances" as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

3. Each Respondent is a "person" as defined by Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

4. A title search conducted by Solutia, Inc. in February, 1999, found no records indicating that title to Dead Creek had ever been deeded.

5. The conditions described in the Findings of Fact above constitute an actual or threatened "release" of a hazardous substance from the facility into the "environment" as defined by Sections 101(8) and (22) of CERCLA, 42 U.S.C. §§ 9601(8) and (22).

6. The conditions present at the Site constitute an imminent and substantial threat to public health, welfare, or the environment based upon the factors set forth in Section 300.415(b)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan, as amended ("NCP"), 40 C.F.R. § 300.415(b)(2). These factors include, but are not limited to, the following:

   A) Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations or the food chain.

   This condition exists at the Site due to the high levels of organic and inorganic contaminants found in the sediments and surface water of Dead Creek which is located in close proximity to local populations and could potentially be released into residential areas via flood waters caused by the shallow water table in the area and the presence of blocked or inadequately sized culverts. Some of the contaminants in Dead Creek are known carcinogens or suspect carcinogens. Contaminants present in Dead Creek and potentially migrating from Dead Creek via overflow and flood waters to nearby residential areas are accessible to humans, specifically the residents and children who live and play on these potentially affected properties. These individuals could potentially be exposed to the contamination by direct skin contact with the sediments, soils and surface water in or released from Dead Creek.

   B) Weather conditions that may cause hazardous substances or pollutants to migrate or be released.

   This factor is present at the Site due to the fact that high levels of organic and inorganic contaminants are located within the sediments, certain adjacent soils and surface waters of Dead Creek. This area of St. Clair County is particularly prone to flooding due to a very shallow groundwater table. Storm water backing up behind culverts exacerbates the flooding conditions in this area.

C) Availability of other appropriate federal or state response mechanisms to respond to the release.

The Illinois EPA currently does not have the available funds to respond to this time-critical situation. In addition, EPA is in the lead agency for enforcement actions related to the Sauget Area One Site.

7. The actual or threatened release of hazardous substances from the Site may present an imminent and substantial endangerment to the public health, welfare, or the environment within the meaning of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

8. The removal actions required by this Order are necessary to protect the public health, welfare, or the environment, and are not inconsistent with the NCP and CERCLA.

V. ORDER

Based upon the foregoing Findings of Fact, Conclusions of Law, Determinations, and the Administrative Record for this Site, EPA hereby orders that Respondents perform the following actions:

1. Notice of Intent to Comply

Respondents shall notify in writing within three (3) business days after the effective date of this Order of Respondents' irrevocable intent to comply with this Order. Failure of each Respondent to provide such notification within this time period shall be a violation of this Order.

2. Designation of Contractor, Project Coordinator, and On-Scene Coordinator

Respondents shall perform the removal actions themselves or retain contractors to implement the removal actions. Respondents shall notify EPA of Respondents' qualifications or the name and qualifications of such contractors, whichever is applicable, within five (5) business days of the effective date of this Order. Respondents shall also notify EPA of the name and qualifications of any other contractors or subcontractors retained to perform work under this Order at least five (5) business days prior to commencement of such work. EPA retains the right to disapprove of the Respondents or any of the contractors and/or subcontractors retained by the Respondents. If EPA disapproves a selected contractor, Respondents shall retain a different contractor within two (2) business days following EPA's disapproval and shall notify EPA of that contractor's name and qualifications within three (3) business days of EPA's disapproval.

Within five (5) business days after the effective date of this Order, the Respondents shall designate a Project Coordinator who shall be responsible for administration of all the Respondents' actions required by the Order and submit the designated coordinator's name, address, telephone number, and qualifications to EPA. To the greatest extent possible, the Project Coordinator shall be present on-site or readily available during site work. EPA retains the right to disapprove of any Project Coordinator named by the Respondents. If EPA disapproves a selected Project Coordinator, Respondents shall retain a different Project Coordinator within three (3) business days following EPA's disapproval and shall notify EPA of that person's name and qualifications within four (4) business days of EPA's disapproval. Receipt by Respondents' Project Coordinator of any notice or communication from EPA relating to this Order shall constitute receipt by all Respondents.

The EPA has designated Kevin Turner of the Emergency Response Branch, Region 5, as its On-Scene Coordinator ("OSC"). Respondents shall direct all submissions required by this Order to the OSC at 8588 Rt. 148, Marion, Illinois 62959, by certified or express mail. Respondents shall also send a copy of all submissions to Thomas Martin, Associate Regional Counsel, 77 West Jackson Boulevard (C-14J), Chicago, Illinois 60604-3590. All Respondents are encouraged to make their submissions to EPA on recycled paper (which includes significant post-consumer waste paper content where possible) and using two-sided copies.

3. Work to be Performed

Respondents shall perform, at a minimum, the following response activities:

A) Prepare a Time Critical Removal Action Work Plan (also referred to herein as "Work Plan") and implement the Removal Action in accordance with the Work Plan to mitigate the threats posed by presence of contamination in Dead Creek sediments and certain adjacent soils and their potential migration via overflow and flood waters from the Site, as described in Section III, "Findings of Fact" of this Order. As more specifically described below, this Work Plan shall provide for: 1) the removal of materials from CS-B (creek sediments, creek bed soils and flood plain soils); CS-C, D, E, a portion of F (non-native creek sediments only); the basin area at the lift station; and Site M (pond sediments and pond bottom soils) in Sauget Area One, while minimizing adverse impacts to area wetlands and habitat; 2) the proper handling, dewatering, treatment and placement of such materials in the on-site Containment Cell; 3) a plan for management of Dead Creek storm water; 4) the sampling and analysis of areas where materials has been removed, for the purpose of defining remaining contamination; 5) the placement of membrane liner material over CS-B and in all other excavated areas where, based on post removal sample results, such liner is determined to be necessary; and 6) a design for the Containment Cell which will provide adequate protection to human health and the environment.

B) Respondents' Work Plan shall describe the implementation of the following actions, including associated implementation schedules:

1. Sediment and Soils Removal Requirements

Respondents shall remove materials from CS-B (creek sediments, creek bed soils and flood plain soils); CS-C, D, E, a portion of F (creek sediments only); the basin area located at the lift station; and Site M (pond sediments and pond bottom pond soils) in Sauget Area One from Dead Creek and adjacent areas (collectively referred to as "materials") for disposal in the on-site Containment Cell. Such removal shall begin as soon as possible but no later than six months after the date of this Order. For the purposes of this Order, the approximate volumes of materials (both sediments and soils) to be removed and disposed of in the Cell are as follows:

CS-B and Site M contain an estimated volume of 25,500 cubic yards (cy) of metals and organic-containing sediment and soil:

CS-B sediment	2000ft L x 50 ft W x 2 ft D = 7,400 cy
CS-B creek bed soil	2000 ft L x 50 ft W x 1 ft D = 3,700 cy
CS-B flood plain soil	2000ft L x 100 ft W x 1 ft D = 7,400 cy
Site M sediment	64,000 sq ft x 1.6 ft = 3,500 cy
Site M pond bottom soil	64,000 sq ft x 1 ft = 3,500 cy
	Total = 25,500 cy

CS-C, D, E, a portion of F, and the basin area located at the lift station contain an estimated volume of 29,400 cubic yards of metal and organic-containing sediment:

CS-C sediment	1400ft L x 50 ft W x 2 ft D = 5,200 cy
CS-D sediment	1200ft L x 50 ft W x 2 ft D = 4,400 cy
CS-E sediment	4000ft L x 50 ft W x 2 ft D = 14,800 cy
Portion of CS-F sediment, and basin area at lift station	=5,000 cy
	Total = 29,400cy

The estimated volume of sediment and/or soil in CS-B and Site M is 25,500 cubic yards and CS-C, D, E, a portion of F, and the basin area located at the lift station contain an estimated volume of 29,400 cubic yards of sediment, a total of 54,900 cubic yards impacted sediment and soil. The above volumetric estimate for CS-B includes removal of one foot of creek bed soils and flood plain soils in addition to the sediments in CS-B. The estimate for Site M includes one foot of pond bottom soils in addition to the sediments. Only sediments are to be removed from CS-C, D, E, a portion of F, and the basin area located at the lift station. In implementing such removal in CS-C, D, E, a portion of F, and the basin area located at the lift station, "sediments" shall be defined in accordance with the following criteria and procedure:

a. Four objective criteria shall be used to identify "sediment" subject to removal, as follows: criteria (i)-(iii) shall be employed to make the determination in the first instance; if application of these criteria are not determinant, then criteria (iv) shall be used. The OSC shall have the authority to require the use of criteria (iv) at any time during the project. However, in any case, criteria (iv) shall be employed every 200 feet as a control on the application of criteria (i)-(iii).

b. The four criteria:

(i) Origin – non-native vs. native sediments

(ii) Stratigraphy – sediments/soil boundary

(iii) Color – sediment color versus creek bottom soil color

(iv) Physical Characteristics

* Unconfined compressive strength less than 500 pounds per square foot (psf)
* Torvane shear strength less than 200 pounds psf
* Moisture content greater than the liquid limit.
* Moisture content greater than 60 percent

2. Materials Handling, Dewatering, And Treatment Requirements

Once materials are removed from in and around CS-B, and from in CS-C, D, E, a portion of F, the basin area located at the lift station and Site M, Respondents shall, as necessary, dewater such materials, using one or more of the following dewatering methods:

* In-Situ Gravity Dewatering
* In-Situ Solidification
* On-Site Gravity Dewatering
* On-Site Solidification

At a minimum, dewatered materials shall pass the Paint Filter Test (as set out in 35 Illinois Administrative Code (IAC) § 724.414(c)) in the Containment Cell. A solidifying agent (meeting the requirements of 35 IAC § 724.414(e)) shall be added, if necessary, during compaction of the sediments in the Containment Cell in order to pass the Paint Filter Test.

3. Storm Water Management Requirements

During the project, Respondents shall divert storm water around CS-B work areas using temporary berms, sheet piling or similar diversion structures, or storm water may be pumped around these work areas and discharged downstream. Runoff from disturbed work areas shall be routed to a gravel and sand filter dam at the downstream end of CS-B and then discharged downstream.

During the project, Respondents shall hydraulically isolate Site M from Dead Creek by closing the opening between CS-B and the southwestern corner of Site M using compacted soil, sheet pile or other suitable method. Impounded water shall be routed to a gravel and sand filter dam at the downstream end of CS-B and then discharged downstream.

4. Excavated Area Soil Sampling

After the sediment and soils removal has taken place, Respondents shall collect soil samples from, at a minimum, all excavated areas of CS-B, C, D, E, a portion of F, and the basin area located at the lift station at 100 ft. intervals (to be referred to as "transects"), starting at the upstream end of the channel at Queeny Road and terminating near the downstream end of the channel at Route 3. Each creek transect, and sample location, shall be identified and numbered for reference purposes. Sampling at each creek transect shall occur at a frequency of no less than 3 samples per transect. Of the 3 samples, one shall be located at the transect center line and the other two shall be located equidistant to the center and the edge of the excavation area. Due to the fact that soils leaching to groundwater is the primary concern, bottom soil samples shall be extracted using TCLP and analyzed for Total Compound List/Total Analyte List (TCL/TAL) parameters and dioxin/furans.

Soil samples shall be collected from the bottom of Site M at 100 ft. grid intervals covering the entire excavated area. Pond bottom soils will be extracted using the TCLP and analyzed for TCL/TAL parameters and dioxin/furans.

5. Excavated Areas Bottom Liner Requirements

After excavation and sampling, Respondents shall properly install and maintain a 40 mil, HDPE liner in CS-B of Dead Creek. A liner shall be installed in other excavated areas of Site M and CS-C, D, E, a portion of F, and the basin area located at the lift station, as determined to be necessary based on post-excavation sampling to isolate impacted soils from surface water. An overflow structure shall be installed to allow accumulated rainwater to discharge into CS-B.

6. Containment Cell Design Report Requirement

Respondents' Work Plan shall include a Containment Cell Design Report for the on-site cell. Such Design Report, upon approval, shall become an enforceable part of this Order. The Design Report shall address applicable requirements of 35 IAC § 724.401, including, at a minimum, the following:

* Above grade construction
* Construction on a 3 ft. thick, permeable capillary barrier drain sloped to a collection sump
* Water from the capillary barrier drain collection sump shall be discharged to the American Bottoms Publicly Owned Treatment Works (POTW)

* Installation of a Bentomat layer on top of the capillary barrier drain
* Double-lined cell
* 60 mil HDPE primary membrane
* 60 mil HDPE secondary membrane
* Sand and/or gravel leachate collection system above primary liner
* Leachate shall be treated, if necessary, and discharged to the American Bottoms POTW
* Geosynthetic leak detection system above secondary liner
* Groundwater monitoring program in compliance with the requirements set forth at 35 IAC § 724, Subpart F and 40 C.F.R. Part 264, Subpart F. Such program shall also monitor to establish background levels and detect potential leachate migration for, at a minimum, TCL/TAL parameters
* Storm water downchutes off cap designed to handle 25 year, 24 hour storm
* Slopes designed to resist failure and erosion as flood waters recede
* Gravel or equivalent armoring of potentially flooded slopes
* Gravel or equivalent cover to resist floating and erosion during flooding
* Air venting to prevent cell floating during flooding
* Cell design and air venting to prevent polychlorinated biphenol (PCB) releases into the air by way of dust, fumes or via hot weather vapors
* Construction in accordance with the Construction Quality Assurance Program requirements found at 35 IAC § 724.119, to the extent practicable.

In addition to including the requirements listed above, the Design Report shall, at a minimum, address the RCRA minimum technology requirements set forth in Exhibit 2, attached to this Order.

C) Mitigation Plan

Sixty days after the completion of the sediment and soils removal activities required by this Order, Respondents shall submit to EPA a Mitigation Plan which contains a detailed statement describing the steps Respondents have taken and are taking to ensure that the actions required by this Order are implemented in such a way as to avoid and/or minimize adverse impacts to area wetlands and habitat. Respondents' Mitigation Plan shall also provide for the replacement of all habitat and wetlands unavoidably lost in the implementation of the project. Specifically, Respondents' Mitigation Plan shall provide an accounting of all wetlands and habitat adversely affected by the project and the specific actions Respondents will take, and an associated schedule, to provide replacement of the value and function associated with such lost wetlands and habitat. The Mitigation Plan shall also include a plan for investigating any potential "hot spots" of contamination found in the Borrow Pit Lake located directly west of Creek Segment F. This "hot spot" investigation plan shall also provide for the remediation of those sediments in the Borrow Pit Lake that are found to be acting as a source to further risk to human health and the environment.

D) Operations and Maintenance Plan

Sixty days after the completion of the construction of the on-site Containment Cell, Respondents shall submit to EPA an Operation and Maintenance Plan for the Cell complying with the requirements set forth in 40 C.F.R. § 761.75(b)(8) and 40 C.F.R. § 264.303. In addition, such operation plan shall specify the following minimum Containment Cell waste acceptance criteria:

* Metal and organic containing sediments, creek bottom soil and flood plain soil from Area One only shall be placed in the Containment Cell.

* No liquids or incompatible wastes shall be placed in the Containment Cell.

* Material placed in the Containment Cell shall pass the Paint Filter Test.

* One sample shall be collected for every 5,000 cubic yards of material place in the Cell and analyzed for TCL/TAL parameters and dioxin/furans to characterize the material placed in the Containment Cell.

Respondents' Containment Cell Operation and Maintenance Plan shall include provisions for record keeping and closure/post-closure procedures for the Cell complying with the requirements set forth at 40 C.F.R. § 264.309 and § 264.310.

Respondents' Containment Cell Operation and Maintenance Plan shall include Groundwater Monitoring and Corrective Action Program Plans for the cell that comply with the requirements of 35 IAC § 724, Subpart F, and 40 C.F.R. Part 264, Subpart F.

3.1 Work Plan and Implementation

Within fifteen (15) business days after the effective date of this Order, the Respondents shall submit to EPA for approval a draft Time Critical Removal Action Work Plan for performing the removal activities set forth in Subsections V.3.B) 1., 2., 3., 4., 5. and 6. above. The draft Work Plan shall provide a description of, and an expeditious schedule for, the activities required by the above subsections.

EPA may approve, disapprove, require revisions to, or modify the draft Work Plan. If EPA requires revisions, Respondents shall submit a revised draft Work Plan within seven (7) business days of notification. Respondents shall implement the Work Plan as finally approved in writing by EPA in accordance with the schedule approved by EPA. Once approved, or approved with modifications, the Work Plan, the schedule, and any subsequent modifications shall be fully enforceable under this Order. Respondents shall notify EPA at least 48 hours prior to performing any on-site work pursuant to the EPA approved Work Plan.

Respondents shall not commence or undertake any removal actions at the Site without prior EPA approval.

3.2 Health and Safety Plan

Within fifteen (15) calendar days after approval of the Work Plan required by Section V.3.B) of this Order, the Respondents shall submit a Health and Safety Plan for EPA review and comment that ensures the protection of the public health and safety during performance of on-site work under this Order. This Plan shall comply with applicable Occupational Safety and Health Administration regulations found at 29 C.F.R. Part 1910. This Plan shall also include a description of Department of Transportation (DOT) requirements to be used for the disruption of vehicular traffic as a result of this action. If EPA determines it is appropriate, the Plan shall also include contingency planning. Respondents shall incorporate all changes to the plan recommended by EPA, and implement the Plan during the pendency of the removal action.

3.3 Quality Assurance and Sampling

All sampling and analyses performed pursuant to this Order shall conform to EPA direction, approval, and guidance regarding sampling, quality assurance/quality control ("QA/QC"), data validation, and chain of custody procedures. Respondents shall ensure that the laboratory used to perform the analyses participates in a QA/QC program that complies with EPA guidance. Upon request by EPA, Respondents shall have such a laboratory analyze samples submitted by EPA for quality assurance monitoring. Respondents shall provide to EPA the quality assurance/quality control procedures followed by all sampling teams and laboratories performing data collection and/or analysis.

Upon request by EPA, Respondents shall allow EPA or its authorized representatives to take split and/or duplicate samples of any samples collected by Respondents or their contractors or agents while performing work under this Order. Respondents shall notify EPA not less than three (3) business days in advance of any sample collection activity. EPA shall have the right to take any additional samples that it deems necessary.

3.4 Reporting

Respondents shall submit a monthly written progress report to EPA concerning activities undertaken pursuant to this Order, beginning thirty (30) calendar days after the date of EPA's approval of the Work Plan, until termination of this Order, unless otherwise directed by the OSC. These reports shall describe all significant developments during the preceding period, including the work performed and any problems encountered, analytical data received during the reporting period, and developments anticipated during the next reporting period, including a schedule of work to be performed, anticipated problems, and planned resolutions of past or anticipated problems.

Any Respondent that owns any portion of the Site, and any successor in title shall, at least thirty (30) days prior to the conveyance of any interest in real property at the Site, give written notice of this Order to the transferee and written notice of the proposed conveyance to EPA and the State.

The notice to EPA and the State shall include the name and address of the transferee. The party conveying such an interest shall require that the transferee will provide access as described in Section V 4. (Access to Property and Information).

3.5 Final Report

Within sixty (60) calendar days after completion of all removal actions required under this Order, including completion of the Containment Cell and the disposal of the materials subject to this Order in the Cell, the Respondents shall submit for EPA review a Final Report summarizing the actions taken to comply with this Order. The Final Report shall conform to the requirements set forth in Section 40 C.F.R. § 300.165. The Final Report shall also include a good faith estimate of total costs incurred in complying with the Order, a listing of quantities and types of materials removed, a discussion of removal and disposal options considered for those materials, a listing of the ultimate destinations of those materials, a presentation of the analytical results of all sampling and analyses performed, and accompanying appendices containing all relevant documentation generated during the removal action (e.g., manifests, invoices, bills, contracts, and permits).

The Final Report shall also include the following certification signed by a person who supervised or directed the preparation of that report:

Under penalty of law, I certify that, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this report, the information submitted is true, accurate, and complete.

4. Access to Property and Information

Respondents shall provide or obtain access as necessary to the Site and all appropriate off-site areas, and shall provide access to all records and documentation related to the conditions at the Site and the activities conducted pursuant to this Order. Such access shall be provided to EPA employees, contractors, agents, consultants, designees, representatives, and State of Illinois representatives. These individuals shall be permitted to move freely at the Site and appropriate off-site areas in order to conduct activities which EPA determines to be necessary. Respondents shall submit to EPA, upon request, the results of all sampling or tests and all other data generated by Respondents or their contractors, or on the Respondents' behalf during implementation of this Order. Respondents shall make all required notifications and obtain all necessary permits from the State and local DOT offices for conducting working within public roadways.

Where work under this Order is to be performed in areas owned by or in possession of someone other than Respondents, Respondents shall obtain all necessary access agreements within fourteen (14) calendar days after the effective date of this Order, or as otherwise specified in writing by the OSC. Respondents shall immediately notify EPA if, after using their best efforts, they are unable to obtain such agreements. Respondents shall describe in writing their efforts to obtain access. EPA may then assist Respondents in gaining access, to the extent necessary to effectuate the response activities described herein, using such means as EPA deems appropriate.

5. Record Retention, Documentation, Availability of Information

Respondents shall preserve all documents and information, in their possession or in the possession of their contractors, subcontractors or representatives, relating to the work performed under this Order, or relating to the hazardous substances found on or released from the Site, for six years following completion of the removal actions required by this Order. At the end of this six year period and at least sixty (60) days before any document or information is destroyed, Respondents shall notify EPA that such documents and information are available to EPA for inspection, and upon request, shall provide the originals or copies of such documents and information to EPA. In addition, Respondents shall provide document and information retained under this Section at any time before expiration of the six year period at the written request of EPA.

6. Off-Site Shipments

All hazardous substances, pollutants or contaminants removed off-site pursuant to this Order for treatment, storage or disposal shall be treated, stored, or disposed of at a facility in compliance as determined by EPA, with the EPA Off-Site Rule, 40 C.F.R. § 300.440.

7. Compliance With Other Laws

All actions required pursuant to this Order shall be performed in accordance with all applicable local, state, and federal laws and regulations except as provided in CERCLA Section 121(e) and 40 C.F.R. § 300.415(I). In accordance with 40 C.F.R. § 300.415(I), all on-site actions required pursuant to this Order shall, to the extent practicable, as determined by EPA, considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws. EPA has determined that creek segments B, C, D, E, a portion of F, the basin area located at the lift station, and Site M along with the proposed TSCA cell are within the same Area of Concern (AOC) and therefore the consolidation of waste material within the cell, as described in this Order, does not invoke any of the Land Disposal Restrictions (LDRs) under RCRA.

8. Emergency Response and Notification of Releases

If any incident, or change in Site conditions, during the activities conducted pursuant to this Order causes or threatens to cause an additional release of hazardous substances from the Site (including the Containment Cell) or an endangerment to the public health, welfare, or the environment, the Respondents shall immediately take all appropriate action to prevent, abate or minimize such release, or endangerment caused or threatened by the release. Respondents shall also immediately notify the OSC or, in the event of his/her unavailability, shall notify the Regional Duty Officer, Emergency Response Branch, Region 5 at (312) 353-2318, of the incident or Site conditions.

Respondents shall submit a written report to EPA within seven (7) business days after each release, setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. Respondents shall also comply with any other notification requirements, including those in CERCLA Section 103, 42 U.S.C. § 9603, and Section 304 of the Emergency Planning and Community Right-To-Know Act, 42 U.S.C. § 11004.

VI. AUTHORITY OF THE EPA ON-SCENE COORDINATOR

The OSC shall be responsible for overseeing the implementation of this Order. The OSC shall have the authority vested in an OSC by the NCP, including the authority to halt, conduct, or direct any work required by this Order, or to direct any other response action undertaken by EPA or Respondents at the Site. Absence of the OSC from the Site shall not be cause for stoppage of work unless specifically directed by the OSC.

EPA and Respondents shall have the right to change their designated OSC or Project Coordinator. EPA shall notify the Respondents, and Respondents shall notify EPA, as early as possible before such a change is made, but in no case less than 24 hours before such a change. Notification may initially be made orally, but shall be followed promptly by written notice.

VII. PENALTIES FOR NONCOMPLIANCE

Violation of any provision of this Order may subject Respondents to civil penalties of up to $27,500 per violation per day, as provided in Section 106(b)(1) of CERCLA, 42 U.S.C. § 9606(b)(1). Respondents may also be subject to punitive damages in an amount up to three times the amount of any cost incurred by the United States as a result of such violation, as provided in Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3). Should Respondents violate this Order or any portion hereof, EPA may carry out the required actions unilaterally, pursuant to Section 104 of CERCLA, 42 U.S.C. § 9604, and/or may seek judicial enforcement of this Order pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606.

VIII. REIMBURSEMENT OF COSTS

Respondents shall reimburse EPA, upon written demand, for all response costs incurred by the United States in overseeing Respondents' implementation of the requirements of this Order.

EPA may submit to Respondents on a periodic basis a bill for all response costs incurred by the United States with respect to this Order. EPA's Itemized Cost Summary, or such other summary as certified by EPA, shall serve as the basis for payment.

Respondents shall, within (30) days of receipt of the bill, remit a cashier's or certified check for the amount of those costs made payable to the "Hazardous Substance Superfund," to the following address:

U.S. Environmental Protection Agency
Superfund Accounting
P.O. Box 70753
Chicago, IL 60673

Respondents shall simultaneously transmit a copy of the check to the Director, Superfund Division, U.S. EPA Region 5, 77 West Jackson Blvd., Chicago, Illinois 60604-3590. Payments shall be designated as "Response Costs – Sauget Area One Dead Creek Sediment Removal" and shall reference the payers' names and addresses, the EPA Site Identification Number (054V), and the docket number of this Order. Interest at a rate established by the Department of the Treasury pursuant to 31 U.S.C. § 3717 and 40 C.F.R. § 102.13 shall begin to accrue on the unpaid balance from the day after the expiration of the 30 day period notwithstanding any dispute or an objection to any portion of the costs.

IX. RESERVATION OF RIGHTS

Nothing herein shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing herein shall prevent EPA from seeking legal or equitable relief to enforce the terms of this Order. EPA also reserves the right to take any other legal or equitable action as it deems appropriate and necessary, or to require the Respondents in the future to perform additional activities pursuant to CERCLA or any other applicable law.

X. OTHER CLAIMS

By issuance of this Order, the United States and EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondents. The United States or EPA shall not be a party or be held out as a party to any contract entered into by the Respondents or their directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out activities pursuant to this Order.

This Order does not constitute a pre-authorization of funds under Section 111(a)(2) of CERCLA, 42 U.S.C. § 9611(a)(2).

Nothing in this Order constitutes a satisfaction of or release from any claim or cause of action against the Respondents or any person not a party to this Order, for any liability such person may have under CERCLA, other statutes, or the common law, including but not limited to any claims of the United States for costs, damages and interest under Sections 106(a) or 107(a) of CERCLA, 42 U.S.C. §§ 9606(a) or 9607(a).

XI. MODIFICATIONS

Modifications to any plan or schedule may be made in writing by the OSC or at the OSC's oral direction. If the OSC makes an oral modification, it will be memorialized in writing within seven (7) business days; however, the effective date of the modification shall be the date of the OSC's oral direction. The rest of the Order, or any other portion of the Order, may only be modified in writing by signature of the Director, Superfund Division, Region 5.

If Respondents seek permission to deviate from any approved plan or schedule, Respondents' Project Coordinator shall submit a written request to EPA for approval outlining the proposed modification and its basis.

No information advice, guidance, suggestion, or comment by EPA regarding reports, plans, specifications, schedules, or any other writing submitted by the Respondents shall relieve Respondents or their obligations to obtain such formal approval as may be required by this Order, and to comply with all requirements of this Order unless it is formally modified.

XII. NOTICE OF COMPLETION

After submission of the Final Report, Respondents may request that EPA provide a Notice of Completion of the work required by this Order. If EPA determines, after EPA's review of the Final Report, that all work has been fully performed in accordance with this Order, except for certain continuing obligations required by this Order (e.g., record retention), EPA will provide written notice to the Respondents. If EPA determines that any removal activities have not been completed in accordance with this Order, EPA will notify the Respondents, provide a list of the deficiencies, and require that Respondents modify the Work Plan to correct such deficiencies. The Respondents shall implement the modified and approved Work Plan and shall submit a modified Final Report in accordance with the EPA notice. Failure to implement the approved modified Work Plan shall be a violation of this Order.

XIII. ACCESS TO ADMINISTRATIVE RECORD

The Administrative Record supporting these removal actions is available for review during normal business hours in the EPA Record Center, Region 5, 77 W. Jackson Blvd., Seventh Floor, Chicago, Illinois. Respondents may contact Thomas Martin, Associate Regional Counsel, at (312) 886-4273 to arrange to review the Administrative Record. An index of the Administrative Record is attached to this Order as Exhibit 3.

XIV. OPPORTUNITY TO CONFER

Within three (3) business days after issuance of this Order, Respondents may request a conference with EPA. Any such conference shall be held within five (5) business days from the date of the request, unless extended by agreement of the parties. At any conference held pursuant to the request, Respondents may appear in person or be represented by an attorney or other representative.

If a conference is held, Respondents may present any information, arguments or comments regarding this Order. Regardless of whether a conference is held, Respondents may submit any information, arguments or comments (including justifications for any assertions that the Order should be withdrawn against a Respondent), in writing to EPA within two (2) business days following the conference, or within seven (7) business days of issuance of the Order if no conference is requested. This conference is not an evidentiary hearing, does not constitute a proceeding to challenge this Order, and does not give Respondents a right to seek review of this Order. Requests for a conference shall be directed to Thomas Martin, Associate Regional Counsel, at (312) 886-4273. Written submittals shall be directed as specified in Section V.2 of this Order.

XV. SEVERABILITY

If a court issues an order that invalidates any provision of this Order or finds that Respondents have sufficient cause not to comply with one or more provisions of this Order, Respondents shall remain bound to comply with all provisions of this Order not invalidated by the court's order.

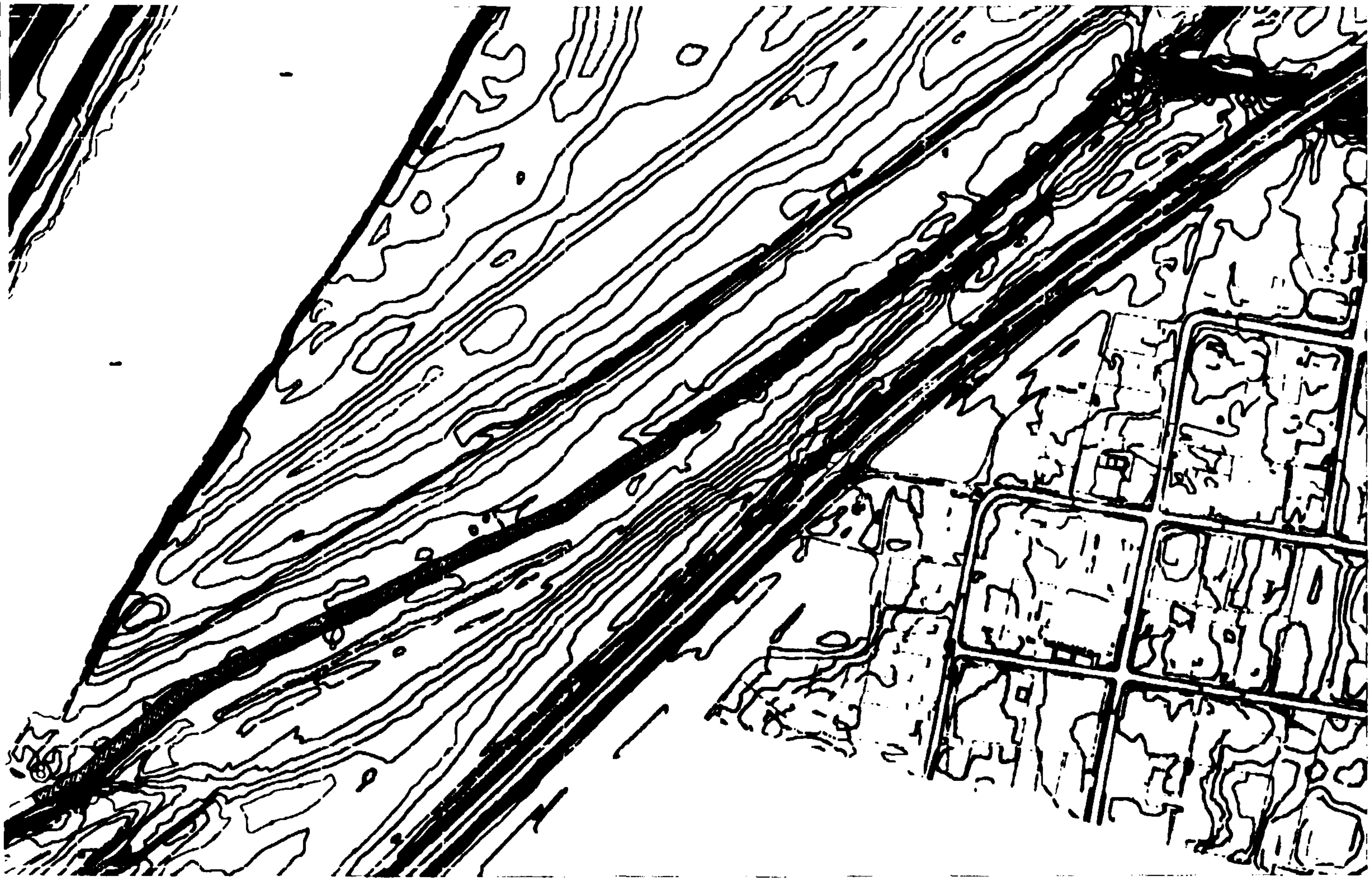
XVI. EFFECTIVE DATE

This Order shall be effective ten (10) business days following issuance unless a conference is requested as provided herein. If a conference is requested, this Order shall be effective five (5) business days after the day of the conference.

IT IS SO ORDERED

BY: W. E. Muno　　　　DATE: 8/29/01

William Muno, Director
Superfund Division
United States Environmental Protection Agency
Region 5



Cross Section	Approximate Distance between Sections (ft)	Cross Section Width (ft)	Excavation Volume per 0.5' cut (cy)	Excavation Volume per 1.0' cut (cy)	Excavation Volume per 1.5' cut (cy)	Excavation Volume per 2.0' cut (cy)	Excavation Volume per 2.5' cut (cy)	Excavation Volume per 3.0' cut (cy)
1 - 2	100.0	12.1	22.4	44.8	67.2	89.6	112.0	134.4
2 - 3	100.0	13.8	25.6	51.1	76.7	102.2	127.8	153.3
3 - 4	100.0	21.6	40.0	80.0	120.0	160.0	200.0	240.0
4 - 5	100.0	29.0	53.7	107.4	161.1	214.8	268.5	322.2
5 - 6	992.0	18.0	330.7	661.3	992.0	1322.7	1653.3	1984.0
6 - 7	987.0	15.0	279.8	553.8	830.8	1107.8	1384.7	1661.7
7 - 8	706.0	20.0	261.1	522.2	783.3	1044.4	1305.6	1566.7

APPROXIMATE TOTAL VOLUMES = 1010.4 | 2020.8 | 3031.2 | 4041.6 | 5051.9 | 6062.3

Approx Total Length = 3084.0

NOTES:

1.) INITIAL BASE MAP SURVEY PERFORMED BY OTHERS.
2.) CREEK SECTION F WIDTHS ESTIMATED USING VISUAL OBERSVATIONS AND EXISTING TOPOGRAPHY MAP. CREEK IS CURRENTLY UNDER FLOOD CONDITIONS.

LEGEND

PROPOSED EXCAVATION AREA

(4) CROSS SECTIONS

SECTION F CROSS SECTIONS

SAUGET AREA 1

CAHOKIA, ILLINOIS

SCALE 1" = 100' | June 8, 2001

MAVERICK
Construction Management Services, Inc.

DESIGNED BY: JP
DRAFTED BY: AP
CHECKED BY:
FILE: Section_F.Dwg

SHEET NO. 1
PROJECT NUMBER:
SHEET 1 OF 1

Exhibit 2

1. DESIGN, CONSTRUCTION, AND OPERATION REQUIREMENTS FOR CONTAINMENT CELL

a. **SEDIMENT DESCRIPTION:**

Provide a list of all constituents found in CS-B, C, D, E, a portion of F, the basin area located at the lift station, and Site M sediments and soils placed or to be placed in the Containment Cell.

b. **LINER SYSTEM:**

Provide a discussion of the following items which apply to the liner system as a whole.

Liner System Description:

Provide a description of the liner system, demonstrating (by description and drawings) that any flow of liquids into and through the liner(s) will be prevented. For each liner within the system (defined as a minimum of one synthetic liner and one soil liner) describe the type of liner, its material and its thickness. The liner system includes the liner foundation, bottom soil or composite liner, leachate detection system, top synthetic liner, leachate collection system and any protective layer placed to protect the leachate collection system from damage and clogging.

Liner System Location Relative to High Water Table:

Provide data showing seasonal fluctuations in the depth of the water table and the location of the seasonal high water table in relation to the base of the liner system. Groundwater levels and liner foundation elevations should be shown on geological cross sections.

Loads on Liner System:

Provide the results of calculations defining the minimum loads or stresses which will be placed on the liner system considering:

* Internal and external pressure gradients;
* Stresses resulting from settlement, compression or uplift;
* Both static and dynamic loads;
* Stresses due to installation or construction operations;
* Stresses resulting from operating equipment; and
* Stresses due to the maximum quantity of waste, cover, and proposed post-closure land use.

Liner System Coverage:

Demonstrate that the liner system will be installed to cover all surrounding earth likely to be in contact with the waste or leachate (i.e., construction, as built, or detailed drawings).

Liner System Exposure Prevention:

Demonstrate that the liner system will not be exposed to wind or sunlight or, if exposure of any part of the system is to be permitted, that such exposure will not result in unacceptable degradation of that portion of the system (i.e., drawings and/or liner specifications as appropriate). If the liner system will be exposed, provide calculations defining the stresses on the liner system due to thermal expansion and contraction.

c. FOUNDATION:

Foundation Description:

Describe the foundation for the liner system, including the foundation materials and indicate bearing elevations on geological and construction drawings. Indicate any load bearing embankments placed to support the liner system.

Subsurface Exploration Data:

The engineering characteristics of the liner system foundation materials, including subsurface soil, bedrock and hydrogeologic conditions, should be verified through subsurface explorations. These efforts should be fully described by including location plans and cross sections for test borings, test pits, etc., and explanations or references for the procedures used, and may include:

* Historical data;
* Test borings;
* Test pits or trenches;
* In situ tests; and/or
* Geophysical exploration.

Laboratory Testing Data:

Results from sufficient index testing must be provided to classify the site materials. Other lab test data should be provided to evaluate the engineering properties of the foundation materials, particularly for strength, hydraulic conductivity, compressibility (consolidation), and other important design parameters. Provide copies of the test methods used to test the material or provide references, as appropriate and with any revisions, to standard test procedures. ASTM, EPA or other appropriate standard methods should be used when available. Contact Illinois EPA Division of Land Pollution Control for Agency approved hydraulic conductivity testing methods.

d. **ENGINEERING ANALYSES:**

Engineering analyses should be provided which are based on the data gathered through subsurface exploration and laboratory testing programs. Include a discussion of the methods used, assumptions, copies of calculations and appropriate references. This discussion may include:

* Settlement potential;
* Bearing capacity;
* Stability of the landfill slopes (cut or constructed);
* Potential for excess hydrostatic or gas pressure;
* Seismic conditions;
* Subsidence potential; and
* Sinkhole potential.

Settlement Potential:

Provide estimates of the total and differential settlement of the liner system foundation, including immediate settlement, primary consolidation and secondary consolidation. When performing the analyses, consider the stresses imposed by liners and the applicable stresses computed in the "Loads on Liner System" in subsection 1.b., above.

Bearing Capacity:

Provide an analysis of the allowable bearing capacity of the liner system foundation. Compare the allowable bearing capacity to the required bearing capacity based on the loads imposed by the liner system and the applicable loads computed loads on liner system.

Stability of Landfill Slopes:

Provide, as appropriate, analyses of the stability of:

* Excavated slopes for units or portions of units constructed below grade;
* Embankment slopes for units constructed with earthen dikes or berms to support the liner system or contain the waste; and
* Cell slopes consisting of the liner system or cover system placed on the waste.

Include in the analyses both static and dynamic cases.

Potential for Excess Hydrostatic or Gas Pressure:

Provide estimates of the potential for bottom heave or blow-out of the liner system due to unequal hydrostatic or gas pressure.

e. **SYNTHETIC LINERS:**

For each synthetic liner in the system provide the following general information:

* Thickness;
* Type;
* Material;
* Brand name; and
* Manufacturer.

Provide data for all synthetic liners under consideration.

Provide detailed synthetic liner material specifications.

Synthetic Liner Compatibility Data:

Provide information demonstrating liner compatibility with constituents found in CS-B, C, D, and E, and Site M.

Synthetic Liner Strength:

Provide data showing that the synthetic liners have sufficient strength to support the loads/stresses including tensile stresses resulting from settlement. Also demonstrate that the liner seams will have sufficient strength.

Synthetic Liner Bedding:

Demonstrate that sufficient bedding will be provided above and below the synthetic liners to prevent rupture of the synthetic liner during installation and operation (i.e., thickness and gradation). Note: The synthetic membrane of a bottom composite liner should be placed directly on the soil portion.

f. **GEOCOMPOSITE LINER (GCL):**

Provide a description of the liner.

Material Testing Data:

Provide information on the permeability, strength and shrink swell properties of the liner material.

GCL Liner Compatibility Data:

Provide information that demonstrates compatibility of GCL liners with constituents found in CS-B, C, D and E and Site M.

GCL Liner Strength:

Demonstrate that the GCL liner has sufficient strength to support the computed loads/stresses.

g. **LINER SYSTEM, LEACHATE COLLECTION AND DETECTION SYSTEM:**

Note: The leachate collection system is located above the top synthetic liner in the liner system and the leachate detection system is located between the liners in the liner system.
Provide the following information about the leachate collection/detection systems (also provide detailed material specifications):

System Operation and Design:

Describe the design features of the leachate collection and removal system and how the system will function to remove collected leachate in a timely manner. Describe the design features of the leachate detection system and how the system will function to detect any leakage through either liner in a timely manner. Describe how liquid can be removed from the leachate detection system. Describe any protective layer placed over the leachate collection system to protect it from damage caused by the sediment or placement operations.

Equivalent Capacity:

For leachate collection/detection systems which use synthetic drainage material to replace the granular drainage material, demonstrate that the proposed system has a drainage capacity (transmissivity), both in speed and volume, that is equal to or better than a 12-inch thick granular drainage layer that has a hydraulic conductivity of 1 x 10-2 cm/sec.

Grading and Drainage:

Indicate the slopes of the leachate collection/detection systems and provide a contour plan for the system along with a plan showing the layout and spacing of the piping system. For systems with slopes of less than 2%, demonstrate that the proposed system will drain as well as one with a minimum of 2% slopes (i.e., through the use of an alternative design). Provide complete details of the piping system along with any sumps, pumps, etc., used to collect, hold, and transport the leachate. Indicate the fate of the collected leachate. Demonstrate that the leak detection system (located between the liners) is appropriately graded to assure that leakage at any point in the liner system is detected in a timely manner.

Demonstrate that the pipe and pipe perforations are sized sufficiently to handle the expected flow of leachate. For design of the leachate detection system (located between the liners) provide sufficient piping to provide for rapid and timely detection of any leakage. The leachate detection system sumps must be separate from the leachate collection system sumps and provided with provisions for measuring the quantity of collected leachate or leakage.

Maximum Leachate Head:

Describe and demonstrate that the design and operating features will prevent the leachate depth over the top of the primary liner from exceeding one foot (i.e., one foot above the uppermost liner). Provide copies of calculations along with a justification of the assumed parameters and of the numerical technique used.

System Compatibility:

Provide information on the compatibility of the leachate collection/detection systems with the constituents found in CS-B, C, D and E, and Site M waste managed in the Containment Cell and the leachate expected to be generated.

Stability of Drainage Layers:

Demonstrate that the drainage layers of the leachate collection/detection systems have sufficient strength to support the computed loads and stresses (i.e., sufficient soil bearing capacity to support loads). Demonstrate by providing calculations that the drainage layer to be placed on sloped surfaces of the Cell or foundation will be stable during construction.

Strength of Piping:

Demonstrate that the pipe used in the piping systems has sufficient strength (crushing or deflection, as appropriate) to support the computed loads.

Prevention of Clogging:

Demonstrate that the leachate collection/detection systems are designed and operated to prevent clogging (due to piping) of the drainage layer material or the pipes throughout the active life of the Containment Cell. Consideration must be given to physical, chemical, and/or biological clogging. As an alternative, describe how clogging would be detected and what cleanup procedures would be used to restore the capacity of the systems. Include calculations demonstrating the effectiveness of the protection material or system.

h. LINER SYSTEM, CONSTRUCTION AND MAINTENANCE:

1. Material Specifications

Synthetic Liner Specifications:

Provide detailed material specifications for the specific synthetic liner or liners to be used.

GCL Liner Specifications:

Provide detailed material specifications for the GCL to be used.

Leachate Collection/Detection System:

Provide material specifications for:

* Drainage layer material;
* Filter fabric or filter layer;
* Piping; and
* Sumps.

2. Construction Specifications

Liner System Foundation:

For installed foundations, provide construction specifications of the foundation installation procedures. For units which use in-place material for the liner system foundation, provide construction specifications for preparation of the liner system foundation.

GCL Liner:

Describe the procedures for installing the GCL liner.

* Inspection of the synthetic liner bed for material which could puncture the liner (and removal of that material);
* Placement procedures;
* Techniques to be utilized to bond the liner seams; and
* Procedures for protection of the liner before and during placements of material on top of the liner.

Synthetic Liners:

Provide construction specifications for placement of the synthetic liners which include:

* Inspection of the synthetic liner bed for material which could puncture the liner (and removal of that material);
* Placement procedures;
* Techniques to be utilized to bond the liner seams; and
* Procedures for protection of the liner before and during placement of material on top of the liner.

Leachate Collection/Detection System:

Provide construction specifications for placement of all components of the leachate collection/detection system, including:

* Drainage layers;
* Piping;
* Sumps, pumps, etc.;
* Filter layers; and
* Any protective layer placed to protect the system during construction or operation.

i. CONSTRUCTION QUALITY CONTROL PROGRAM:

Provide complete details of the quality control program to be used during construction of the liner system to assure that it is built as designed. Include a description of all testing procedures such as testing of the synthetic liner seams. Indicate if the owner or the contractor will perform the testing and inspection and indicate the necessary qualifications of the testing and inspection personnel. The applicant should refer to the U.S. EPA Technical Guidance Document entitled "Construction Quality Assurance for Hazardous Waste Land Disposal Facilities", EPA/530-SW-031 and to the Construction Quality Assurance Program found in 724.119.

j MAINTENANCE PROCEDURES FOR LEACHATE COLLECTION/DETECTION SYSTEM:

Describe the anticipated maintenance activities that will be used to assure proper operation of the leachate collection/detection systems throughout the Containment Cell's expected life.

k. LINER REPAIRS DURING OPERATION:

Describe the methods that will be used to repair any damage to the liner which occurs while the Cell is in operation during placement of the waste (e.g., a bulldozer ripping the liner).

l. RUN-OFF CONTROL SYSTEMS:

Describe the run-off control system to be used to collect and control run-off from active portions of the Cell.

Design and Performance:

Describe the run-off collection and control system design. Provide calculations demonstrating that the system has sufficient capacity to collect and hold the total run-off volume. Provide a plan view showing the locations of the run-off control system components, along with sufficient drawing details and cross sections. Indicate the fate of the collected run-off.

Calculation of Peak Flow:

Identify the total run-off volume expected to result from at least a 24-hour, 25-year storm. Describe data sources and methods used to make the peak flow calculation. Provide copies of the calculations and data, including appropriate references.

Management of Collection and Holding Units:

Describe how collection and holding facilities associated with run-on and run-off control systems will be emptied or otherwise managed expeditiously after storms to maintain system design capacity. Describe the fate of liquids discharged from these systems.

Construction:

Provide detailed construction and material specifications for the run-off control systems. Include descriptions of the construction quality control program that will be utilized to assure that construction is in accordance with design requirements.

Maintenance:

Describe any maintenance activities required to assure continued proper operation of the run-off control systems throughout the active life of the unit.

Control of Wind Dispersal:

If the Containment Cell contains any particulate matter which may be subject to wind dispersal, describe how the Cell is covered or otherwise managed to control wind dispersal.

2. CLOSURE AND POST-CLOSURE REQUIREMENTS

a. CLOSURE REQUIREMENTS:

1. Closure Plans:

Include a written closure plan including a description of the final cover to be established and its expected performance. Describe how the closure plan provided minimizes the need for post-closure maintenance and minimizes releases of wastes and hazardous constituents.

2. Closure Performance Standard:

Describe how the closure plan provided minimizes the need for post-closure maintenance and minimizes releases of wastes and hazardous constituents.

3. Cover Design:

The cover design and installation procedures should be thoroughly described. This submission should include:

* Drawings showing cover layers, thicknesses, slopes and overall dimensions;
* The common name, species and variety of the proposed cover crop;
* Descriptions of synthetic liners to be used, including chemical properties, strength, thickness and manufacturer's specifications;
* Description of rationale for cover selection;
* Descriptions of and specifications for protective materials placed above and below synthetic liners; and,
* GCL liner characteristics.

4. **Minimization of Liquid Migration**

For all cover designs provide engineering calculations showing that the proposed cover will provide long-term minimization of liquid migration through the cover.

5. **Maintenance Needs:**

Demonstrate that the cover system will function effectively with minimum maintenance needs.

6. **Drainage and Erosion:**

Provide the following information:

* Data demonstrating that the proposed final slopes will not cause significant cover erosion;
* Descriptions of drainage materials and their hydraulic conductivities;
* Engineering calculations demonstrating free drainage of precipitation off of and out of the cover; and
* Estimation of the potential for drainage-layer clogging.

7. **Settlement and Subsidence:**

Describe potential cover settlement and subsidence, considering immediate settlement, primary consolidation, secondary consolidation, and creep and liquefaction. Include the following information:

* Potential foundation compression;
* Potential soil liner compression; and
* Potential waste consolidation and compression resulting from waste dewatering, biological oxidation and chemical conversion of solids to liquids.

Describe the effects of potential subsidence/settlement on the ability of the final cover to minimize infiltration.

8. **Freeze/Thaw Effects:**

Identify the average depth of frost penetration and describe the potential effects of freeze/thaw cycles on the cover.

b. POST-CLOSURE REQUIREMENTS:

1. Post-Closure Plan:

Submit a copy of the post-closure plan.

2. Inspection Plan:

Describe the inspections to be conducted during the post-closure care period, their frequency, the inspection procedure, and the logs to be kept. The following items, as applicable, should be included in the inspection plan:

* Security control devices;
* Erosion damage;
* Cover settlement, subsidence and displacement;
* Vegetative cover condition;
* Integrity of run-on and run-off control measures;
* Cover drainage system functioning;
* Leak detection system;
* Leachate collection and removal system;
* Gas venting system;
* Well condition; and
* Benchmark integrity.

Provide the rationale for determining the length of time between inspections.

3. Post-Closure Monitoring Plan:

Describe the monitoring to be conducted during the post-closure care period, including, as applicable, the procedures for conducting and evaluating the data gathered from:

* Groundwater monitoring;
* Leachate collection and removal; and
* Leak detection between liners.

4. Post-Closure Maintenance Plan:

Describe the preventive and corrective maintenance procedures, equipment requirements and material needs. Include the following items in the maintenance plan, as applicable:

* Repair of security control devices;
* Erosion damage repair;

* Correction of settlement, subsidence and displacement;
* Mowing, fertilization and other vegetative cover maintenance;
* Repair of run-on and run-off control structures
* Leachate removal system maintenance; and
* Well replacement.

Describe the rationale to be used to determine the need for corrective maintenance activities.

5. Notice in Deed and Certification:

Existing facilities must submit a copy of the notice or notation recorded in the deed to the facility property, or on some other instrument which is normally examined during title search, that will in perpetuity notify any potential purchaser of the property that: (1) the land has been used to manage hazardous wastes; (2) its use is restricted; and (3) the survey plat and record of the type, location, and quantity of hazardous wastes disposed of within each cell or area of the facility has been filed with the County Recorder, to any local zoning authority or the authority with jurisdiction over local land use and with the Illinois EPA. For hazardous wastes disposed prior to January 12, 1981, identify the type, location and quantity of the hazardous waste to the best of the owner or operator's knowledge and in accordance with any records the owner or operator has kept. Submit a certification to the Illinois EPA, signed by the owner or operator, that the owner or operator has properly recorded this certification.

Exhibit 6

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September 16, 1996

Docket Coordinator
CERCLA Docket Office
Headquarters
United States Environmental Protection Agency
401 M Street, S.W. (Mail Code 5201G)
Washington, D.C. 20460

Re: Comments on the Proposed Listing of Sauget Area 1, in Sauget and Cahokia, Illinois, on the CERCLA National Priorities List

Dear Docket Coordinator:

These comments are submitted by Monsanto Company ("Monsanto") in response to the proposal by the United States Environmental Protection Agency ("EPA") to list the "Sauget Area 1" sites on the National Priorities List ("NPL"). *See* 61 Fed. Reg. 30,575 (June 17, 1996). Sauget Area 1 is an aggregation of a number of sites located in Sauget and Cahokia, Illinois. We enclose and incorporate by reference the following: Technical Report by Menzie, Cura & Associates, Inc., *Comments on Sauget Area 1 HRS Scoring* ("Menzie-Cura Report") (Exhibit 1); *Historical Assessment of Hazardous Waste Management in Madison and St. Clair Counties, Illinois, 1890-1980* (C. Colten, Oct. 1988) (Exhibit 2); affidavit of Russell Sackett (Exhibit 3); and affidavit of Joseph M. Grana (Exhibit 4).

EPA erroneously calculated the Sauget Area 1 score at 61.85 under the Hazard Ranking System ("HRS"[1]). This score is premised on at least five fundamental errors by the Agency, which when corrected will result in lowering the scores for each individual site and, alternatively, the aggregated score for the entire Sauget Area 1, well below the 28.5 threshold for the NPL. Additional mistakes of a technical nature by the Agency when combined with

1 The HRS is set forth in Appendix A to the National Contingency Plan, 40 C.F.R. Part 300.

the five major errors may result in scores that are even further below the 28.5 threshold. The scoring errors resulted from a variety of incorrect assumptions and misapplications of the HRS, including, among others:

- use of flawed and unreliable data and sampling plans that fail to account for discharges from other nearby industrial sources;
- finding a release to air and water when no such release can be documented;
- improper aggregation of separate areas into one site; and
- treating an Illinois EPA-supervised $13 million remediation of Source 1 as though it had never taken place.

As in *Tex Tin Corporation v. EPA (Tex Tin II)*, 992 F.2d 353, 354 (D.C. Cir. 1993), EPA's "imprecision [has risen] to such a level that agency action becomes arbitrary and capricious and not otherwise in accordance with law."

The first and second fundamental errors are the erroneous conclusions that there was an "observed release" to surface water and an "observed release" to air. EPA has not documented either type of release. The "observed" surface water release is based on chemical analysis of a single *sediment* "release" sample. The required documentation even to establish the validity of the chemical analysis of this critical sample is absent from the administrative record. Indeed, the sample was taken from a location directly downstream of a culvert that discharges wastes from nearby industrial sites which are not part of Sauget Area 1. Source 1, which already was remediated, presents no hazards and requires no further cleanup. Moreover, the single sediment "release" sample was compared with two sediment "background" samples which cannot possibly be correctly characterized as background, since one is downstream of the alleged sources and the other is in an entirely different watershed. The low levels of substances detected in the downstream sample supports the conclusion that any substances present in the alleged Sauget Area 1 sources have *not* migrated to the first downstream creek.

The "observed" air release is artificial and unrealistic. It is based on a single, isolated incident in which a worker, drilling a post hole for a surveillance camera in an area that was fenced off to secure the site, drilled through a buried drum of liquid. This single accident is not appropriate for CERCLA scoring because it does not constitute a release to air. Moreover, even the data concerning this alleged release is defective because the soil samples fail to meet EPA's validation standards under CERCLA. There is no basis whatsoever for concluding that any of the Sauget Area 1 "sources" release any hazardous substances into the air or pose any risk of such a release absent extraordinary outside interference.

EPA's third fundamental error lies in its attempts to aggregate the nine distinct and disparate areas that spread between the villages of Sauget and Cahokia into a single "site." Even though the different areas — which EPA erroneously deems "sources" — vary widely in ownership, operation, disposal practices, and cleanup requirements, and differ in other important ways, EPA strains to magnify their potential threats to the environment by combining them. Scored separately, each of the areas has a score that is even lower than the maximum possible score of the aggregated areas, thus reflecting the sites' true low level of any risk.

Particularly egregious is the inclusion of Source 1 — *i.e.*, Creek Segment A — in the aggregation, and more generally, in any proposed listing. Cerro Copper spent close to $13 million in 1990 to clean Creek Segment A, under the supervision of the Illinois Environmental Protection Agency ("IEPA"). Monsanto and Cerro later reached a settlement allocating the cost of that activity. As the scoring package notes, a total of 27,500 tons of sediments were removed from Creek Segment A and disposed of at authorized landfills. The creek was backfilled, lined with a vapor barrier, and topped with an engineered cover, and presently is used as a parking lot. EPA's hazard ranking package treats this major effort as though it had never taken place. Proposing to list Creek Segment A is not only inappropriate, but also contradicts EPA's common sense Superfund reform guidance which was announced by Administrator Browner on October 2, 1995. The announced purpose of this reform is to eliminate disincentives for early response actions by private parties at sites being considered for the NPL, and to encourage reuse or redevelopment of the property. Proposing to list Creek Segment A thwarts these objectives.

EPA's fourth fundamental error is that EPA erroneously exaggerates the risks posed by any of the sites by miscounting the human "target" population at risk from any actual or potential releases.

As a fifth fundamental error, EPA mischaracterizes two of the sources as "impoundments" in contravention of EPA policy and the facts, thereby greatly overestimating the quantity of hazardous substances deemed to be present under the HRS. EPA's decision to mischaracterize what could — at worst — be considered "contaminated sediment" under the HRS overlooks the manner in which wastes came to be located in these purported sources and results in a significant unjustified increase in the hazardous waste quantity component of the HRS score.

For the reasons set forth in the Menzie-Cura Report and in these comments, the proposal to list Sauget Area 1 on the NPL is arbitrary and capricious and an abuse of discretion. Monsanto therefore requests that EPA act expeditiously to (1) withdraw the proposal to list Sauget Area 1 on the NPL and remove Sauget Area 1 from the list of sites proposed for NPL listing, and (2) not finalize the NPL listing of Sauget Area 1. We address these matters as follows:

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In these Comments, Monsanto will present certain background information and will then describe the significant errors EPA made in scoring Sauget Area 1. The comments are organized generally to correspond to EPA's HRS Documentation Record for Sauget Area 1 ("HRS Documentation Record").

I. BACKGROUND

EPA and state investigations of properties in the vicinity of Sauget and Cahokia, Illinois, began almost 30 years ago; however, attempts to develop information that could justify listing any of the properties on the NPL have repeatedly failed. *See e.g.* Ref. No. 3a at pages 2-53 to 2-65. The subject of the present HRS, Sauget Area 1, consists of a 1.7 mile stretch of Dead Creek and adjacent areas between the villages of Sauget and Cahokia. *See* Menzie-Cura Report at Figure 1, Figure 3, Figure 4. Nine alleged Sauget Area 1 sources are located in and along the sides of Dead Creek. EPA even included its so-called "Source 3" which was never a source of anything. Understandably, EPA was unable to assign any quantity value to this purported "source" and the source contributes nothing to the overall score. Dead Creek and the other alleged sources form a roughly north-south axis which lies roughly one mile east of and parallel to the Mississippi River.

The bigger picture, however, is that the entire area extending from immediately adjacent to the Mississippi River and eastwards through Sauget Area 1 historically has been used for a wide variety of industrial activities. *See* Ref. No. 3a at Ch. 2. The IEPA divided this larger area into two areas, Sauget Area 1 and Sauget Area 2, and a number of "peripheral sites" which IEPA concluded could not be aggregated. Ref. No. 3a at page 2-1; *see also* Menzie-Cura Report at Figure 2. IEPA defined Sauget Area 1 as the northernmost portion of Dead Creek and adjacent sites (now "Sources 1, 2, 4, 5, 6, and 7") and defined the sites south of that as the peripheral sites. Ref. No. 3a at page 2-1 Sauget Area 2 comprises a broad band of properties adjacent to the Mississippi River and parallel to Sauget Area 1 and the peripheral sites. At the north, the two Areas primarily are separated by a mostly undeveloped flatland crossed by rail tracks, and at the south, Area 2 and the peripheral sites are separated by the Philips Petroleum Compressor Tank Farm complex and a small number of homes. A narrow strip of wetland lies south of the Philips Tank Farm, between and below the southern tips of Sauget Area 2 and the peripheral sites.

In December 1984, IEPA submitted to EPA an HRS package showing a score of 29.23 for "Dead Creek and surrounding sites." *See* Ref. No. 3a at page 2-63. EPA rejected the package as deficient. *Id.* To support another scoring attempt, IEPA retained Ecology and Environment, Inc. ("E & E") in 1985 to conduct sampling for an Expanded Site Investigation of both Sauget Area 1 and Sauget Area 2, as well as "peripheral" sites. *See id.* at 64. E & E performed sampling in 1986 and 1987. Altogether, the Expanded Site Investigation studied 18 areas from the Mississippi River eastwards past Dead Creek. *See* Ref. No. 3a at pages 2-1, 2-2, 2-4. Although a large amount of sampling was performed, the study results still could not justify listing any site. Consequently, IEPA conducted additional sampling in 1991. IEPA's samples detected the presence of some substances in a spot within the wetland below the tips of Sauget Area 2 and the peripheral sites. On the basis of that sample, IEPA concluded that it would pursue listing what is now labeled Sauget Area 1, but did not explain why any substance was attributable to Sauget Area 1 as opposed to any other area or site. *See* Ref. No. 4a.

The United States EPA subsequently became involved in rescoring Sauget Area 1 for the present proposed listing. EPA contracted in 1993 with PRC Environmental Management, Inc. ("PRC") for assistance in collecting information to supplement the E & E and IEPA studies. *See* Ref. No. 14 at 1. PRC visited all of the sites, but focused its investigation on what is now labeled Sauget Area 1. *Id.* Since E & E had not validated the laboratory analysis data as would be required to use its 1985 sampling results for HRS scoring, PRC prepared data qualification in 1993 in an attempt to validate the E & E samples.

The HRS Documentation Record creates an inaccurate impression that Sauget Area 1 poses a real threat to the environment. However, while the focus of Sauget Area 1 is Dead Creek, Dead Creek is not at all "dead." *See* photographs at Appendix B in Menzie-Cura Report. Menzie-Cura's certified wildlife biologist surveyed the area and concluded that Dead Creek "appears to support a diverse plant and animal community. . . . No evidence of ecological stress was evident in the upper Creek near the Monsanto facility, nor anywhere else along the waterway's path to the Mississippi." Menzie-Cura Report at App. B, page 4. The Creek at what is now labeled Source 1 and Source 2 is "bordered by a dense, narrow band of riparian trees and shrubs, including cottonwood, willow, mulberry, and box elder." *Id.* at 2. Further south, there is a "small pond . . . where herons, painted turtle, wood duck, fish, and evidence of beaver . . . were observed." *Id.* at 3. The southernmost part of the Creek is "bordered by either riparian vegetation or lawn. Emergent and aquatic vegetation occurs along the creek's shores. Wildlife observed in and adjacent to the stream included herons, turtles, songbirds, squirrel, and raccoon. Small fish and frogs were observed throughout the creek's length." *Id.* at 3. And, as noted previously, the purported "Source 1" has already been the subject of a $13 million remediation undertaken by Monsanto and Cerro Copper.

II. EPA FAILED TO ESTABLISH AN "OBSERVED RELEASE" TO SURFACE WATER

EPA incorrectly scored an "Observed Release" for the surface water overland flood migration component of the HRS scoresheet. *See* HRS Documentation Record at 4, Line 1; 5, Line 14; 6, Line 22. As discussed below, there is no basis for scoring an observed release. In particular, each step of EPA's methodology is permeated, and fatally flawed, by data inaccuracies which violate EPA's own policies and guidelines for the use of data for HRS scoring.

In the absence of any data supporting an observed release to surface water, IEPA performed additional sampling in 1991 in the wetland and in Old Prairie du Pont Creek. EPA asserts that sediment sample x111, taken in the wetland, demonstrates an observed release. EPA compares sample x111 to alleged "background" samples x112 and x113. EPA has improperly relied on these samples in assuming that an observed release occurred.

A. <u>The substances found in sample x111 cannot be attributed to the nine alleged sources at Sauget Area 1.</u>

There may be no better example of EPA's use of bad data than EPA's attempt to use sample x111 to establish an "observed release" from Sauget Area 1. Sample x111 cannot possibly establish such a release.

To establish an observed release based on sediment samples, EPA must establish that "some portion of the significant increase [over background levels is] attributable to the site . . . ." HRS § 4.1.2.1.1 (Ref. No. 1 at 51,609). In particular: "When other sources are present in the vicinity of the site being evaluated and may have contributed to the significant increase (e.g., in highly industrialized areas), it generally is necessary to obtain sufficient samples between the site being evaluated and other known potential sources (or between the site and adjacent sites) in order to demonstrate an increase in concentration attributable to the site." EPA, *Hazard Ranking System Guidance Manual* at 59 (OSWER Pub. 9345.1-07, Nov. 1992) ("EPA Guidance Manual").

In this matter, EPA apparently located its purported "release" sample x111 so as to maximize rather than minimize the possibility of off-site interference. Certainly EPA failed to address whether or not the substances detected in sample x111 are attributable to areas outside of Sauget Area 1, including but not limited to Sauget Area 2 and the Philips Tank Farm. Cahokia county has for many years been the location of a wide variety of heavy industrial activities. Studies have made various references to numerous alleged industrial sources. *See e.g. Historical Assessment of Hazardous Waste Management in Madison and St. Clair Counties, Illinois, 1890-1980* (Exhibit 2). Other potential sources in the immediate area include, among others, Big River Zinc, Sterling Steel Foundry, Mobil Oil, Wiese Planning & Engineering Co., Metro Construction Co., Keeley Construction Co., Midwest Rubber Co., the Sauget Wastewater Treatment Plant, Trade West Incineration, Clayton Chemical Co., and the Beacon Parks College Airport. *See e.g.* Reference No. 6 at 6-7.

1. <u>Any substances detected in sample x111 are attributable to the Philips Tank Farm culvert and the road culvert, outside of Sauget Area 1.</u>

As Menzie-Cura discusses, sample x111 was taken from a location immediately downstream of two culverts that discharge surface water into the wetland from sources other than Sauget Area 1. Specifically, these culverts discharge from an industrial facility, the

Philips Petroleum Compressor Tank Farm, and from upstream areas that may receive wastes from the southern end of Sauget Area 2, particularly during floods. *See* Menzie-Cura Report at 9 and Figures 3 to 4. EPA apparently is unaware of these culverts and failed to use appropriately located samples to demonstrate that the sample x111 substances are not attributable to the Philips facility or to any other sources draining to the culverts. Available data, by contrast, point strongly to these other sources. As discussed below, a comparison of sample x111 with the other samples at the alleged "sources" strongly suggests that the concentrations found at x111 originate from sources other than Sauget Area 1.

2. **<u>Substances detected in sample x111 cannot be attributed to the alleged sources in Sauget Area 1.</u>**

Ignoring the direct discharge from the Philips Tank Farm culvert and the road culvert, EPA assumes instead that the substances detected in sample x111 were funneled from the nine alleged Sauget Area 1 sources through Dead Creek. EPA's unfounded assumption contradicts the results of IEPA samples x108, x109, and x110. These three samples were taken in Dead Creek immediately upstream of the wetland and upstream of the Philips Tank Farm culvert. As Menzie-Cura discusses, samples x108, x109, and x110 are taken from a depositional area closer to EPA's alleged "sources," yet have no detected levels of polychlorinated biphenyl compounds ("PCBs"). Menzie-Cura Report at 9-10. It is fundamental that sediment which contains PCBs and metals, and which is transported by water, cannot jump over segments of a water body. If these substances were in fact originating from EPA's alleged sources, they should be present in the closer x108, x109 and x110 samples at higher — not lower — levels. The fact that they are not detected or present in samples closer to the sources demonstrates that the substances found in sample x111 cannot be attributed to any of the alleged Area 1 sources.

3. **<u>EPA incorrectly assumes that there are generally decreasing constituent concentrations from the Sauget Area 1 alleged sources to the sample x111 location.</u>**

As yet another example of EPA's badly mistaken use of the data, EPA incorrectly assumes that the substances detected in sample x111 are present in the Sauget Area 1 alleged sources in concentrations that generally decrease from the northern sources to the sample x111 location. HRS Documentation Record at 99. EPA constructed this purported PCB concentration gradient based on only four surface sediment samples in Area 1 selected by EPA out of a much larger data set. EPA concludes that this purported gradient demonstrates that the sample x111 substances are attributable to Sauget Area 1. However, as Menzie-Cura discusses, EPA's methods to establish a gradient were defective, and in fact there is no gradient. Menzie-Cura Report at 7. Thus, the totality of the available data demonstrates that the sample x111 substances cannot be attributed to Area 1.

EPA's first technical data error is the failure to normalize the sample data, so that the sample locations can be properly compared. The accepted method for using sediment data to establish surface water transport gradients requires that contaminant data must be normalized for physical and chemical variations in the samples. *See* EPA, *Briefing Report to the EPA Science Advisory Board on the Equilibrium Partitioning Approach to Predicting Metal Bioavailability in Sediments and the Derivation of Sediment Quality Criteria for Metals* (Office of Water and Office of Research and Development, 1994). Normalization accounts for factors such as each sample's sediment grain size and total organic carbon, because, as EPA itself acknowledges, these factors affect the concentration of contaminants that will adhere to the sediments at each sample location. See below, at II(C)(3). Because EPA did not normalize the sample data, the sample data cannot be compared to one another and the concentration gradient EPA constructed from these samples is meaningless.

EPA's second error is the selection of only four samples, which happen to fit the pattern EPA hoped to demonstrate. Menzie-Cura plotted all available surface sediment and surface soil sampling data along with the four samples EPA selected. When all of the surface data are viewed together, rather than the selective picture EPA attempted to paint, the samples do *not* establish a gradient. *See* Menzie-Cura Report at Figures 6, 8, 9, 10. The data are random numbers following no pattern whatsoever. Thus, by EPA's own logic, the samples data demonstrate that the sample x111 substances cannot be attributed to Sauget Area 1. To the contrary, the totality of the data demonstrates that any contamination of the wetland is caused by sources outside of Sauget Area 1.

B. <u>The samples used to establish an "observed release," and the samples used to attribute the release to Sauget Area 1 sources, did not follow proper protocol.</u>

EPA manifested total disregard for the quality of the data it used in justifying the NPL listing, in direct contravention of the National Contingency Plan ("NCP") and numerous EPA guidelines that set forth data quality requirements. EPA's guidelines require that the HRS Documentation Record contain the data necessary for an independent observer to replicate the scorer's determination that the supporting data are valid. As Menzie-Cura discusses, EPA relies on samples x111, x112, and x113 to demonstrate the alleged "observed release," but the HRS Documentation Record fails to provide the required quality assurance/quality control ("QA/QC") data for those samples to establish their validity. Moreover, Menzie-Cura discusses quality control deficiencies in the observed release samples and severe problems in the samples results that EPA used to attribute releases to Sauget Area 1 alleged sources. In accordance with EPA's own QA/QC criteria and documentation requirements, all of the sample results are fatally flawed and cannot be used to demonstrate an observed release and to attribute any such release to the Sauget Area 1 alleged sources.

EPA's HRS Guidelines state in part, with original emphasis reprinted: "The documentation record is the central element of the HRS package. It contains all of the information upon which a site score is based and a list of the references from which the information was obtained. *If a site's listing is challenged in court, EPA's defense of the site score is restricted to the information contained in the documentation record.* . . . As a general rule, HRS documentation should be sufficient for an independent observer to replicate the observations, measurements, and calculations and arrive at the same quantitative or qualitative decision (factor value)." EPA Guidance Manual at 27.

EPA requires extensive QA/QC data from its contractors and private parties. The NCP requires the following as a precondition to the performance of a site investigation:

> Prior to conducting field sampling as part of site inspections, the lead agency shall develop sampling and analysis plans that shall provide a process for obtaining data of sufficient quality and quantity to satisfy data needs. The sampling and analysis plan shall consist of two parts:
>
> (i) The field sampling plan, which describes the number, type, and location of samples, and the type of analyses, and
>
> (ii) The quality assurance project plan (QAPP), which describes policy, organization, and functional activities, and the data quality objectives and measures necessary to achieve adequate data for use in site evaluation and hazard ranking system activities.

40 C.F.R. § 300.420(c)(4).

EPA has published numerous requirements for data quality control for sampling used to support HRS listing. Of particular note in this matter are *Guidance for Performing Site Inspections Under CERCLA* (EPA Directive 9345.1-05, Sept. 1992) ("SI Guidance") and *Using Qualified Data to Document an Observed Release* (EPA, OSWER Directive 92875.7-14FS, July 1994) ("Qualified Data Guidance").

EPA's SI Guidance presents procedural guidelines for investigating sites for the purpose of HRS scoring. *See* SI Guidance at viii. It states: "All analytical data should be evaluated for validity and applicability before scoring. Site assessment validation includes review of laboratory analyses and comparison of the body of data to performance criteria." *Id.* at 97. In particular, it requires that the investigator evaluate analytical data and laboratory information to determine whether sampling protocols and procedures used approved methods. *Id.* The reviewer is required to examine: sampling dates, locations, depths, and descriptions; sample collection and preparation techniques; laboratory preparation techniques, analytical methods, and analytical results; method detection limits or sample quantitation limits; QA/QC samples; and related documentation. *Id.* Laboratory data packages must be validated, including sample holding times, initial and continuing calibration verification, interference check samples for inorganics, bias determination, precision, detection limits, and confirmed identification data. *Id.* These requirements prevent inappropriate application of the data and exclusion of unacceptable data. *Id.*

EPA requires that only results that meet the two most rigorous data quality levels can be used to demonstrate observed releases and attribution of such releases to sources, or for any other HRS scoring purposes. *See id.* at 99-100 & Table 5-2. These levels are referred to as Data Use Category I ("DUC-I") and DUC-II. *Id.* EPA did not observe its own requirement, however, with regard to the Sauget 1 data used to establish an observed release for surface water and for air.[2] Because of EPA's failure to follow its own rules, EPA may not use these data and has not established an observed release or attribution of any particular substances to any of the alleged "sources" that EPA deems to comprise Sauget Area 1.

EPA also provides detailed rules limiting the circumstances in which qualified data, *i.e.* data with known deficiencies, can be used for HRS scoring. Threshold requirements for using qualified data are first, that the reasons for qualification must be known, and second, that the bias of the data must be known. SI Guidance at 99. *See generally* Qualified Data Guidance. Moreover, qualified data can only be used if its bias is towards the conservative side of the determination for which it is being used. *Id.* For instance, high-biased samples cannot be used to demonstrate a release, and low-biased samples cannot be used to demonstrate background levels, unless the sampling concentrations are adjusted by specific factors pursuant to EPA's guidelines. In the present matter, EPA did not follow its own rules on the use of qualified data.

Menzie-Cura's Report and its *Appendix A - Data Usability Review* thoroughly document EPA's numerous violations of the *SI Guidance* and of the *Qualified Data Guidance* which lead Menzie-Cura to conclude that the release and attribution data relied on by EPA cannot be used to support HRS scoring. Highlights of the *Data Usability Review* are discussed below.

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[2] With regard to the purported surface water release, the record contains only a four sentence IEPA memorandum stating in conclusory terms that the sample data are valid. The letter fails to address DUC standards. *See* Ref. No. 4b at 10; Menzie-Cura Report at App. A, § 7.3. With regard to the purported air release, the record contains an incomplete laboratory package that fails to address DUC standards. *See* Ref. No. 53; Menzie-Cura Report at App. A, § 8.3.

1. **<u>All of the samples that EPA uses to support the alleged "observed release" to surface waters must be disregarded because the record fails to contain the required QA/QC data.</u>**

Sample results for x111, x112, and x113 must be disregarded, and cannot be used to support EPA's assumption that there has been an "observed release" to surface waters, because the HRS Documentation Record and its supporting References fail to contain the appropriate QA/QC data, as required by sound scientific practice and EPA guidance itself to establish that the data are valid.[3] The record is thus silent on whether any field or method blank samples or spiked samples were analyzed, whether the equipment had been properly calibrated and, if so, how often, whether the samples were subjected to chain-of-custody procedures, and whether the myriad other routine QA/QC procedures required by EPA have been followed. Absent this QA/QC documentation in the record, there is no basis for treating the "data" as a reliable basis for administrative action.

As Menzie-Cura discusses, the Documentation Record and References fail to contain information required to establish the validity of the data in the first instance and required by an independent observer to review EPA's decision to score an observed release to surface water. EPA relies on the limited "x" series sample data included in Reference Numbers 4a and 4b, but the Record does not contain any of the supporting laboratory data needed for QA/QC validation. The missing information includes, at least in part, sample result chromatograms, extraction logs, quality control report forms, percent solids calculations, instrument run logs, preparation bench sheets, example result calculations, standard chromatograms, initial calibrations, continuing calibrations, method blanks, instrument blanks, surrogate recoveries, matrix spike recoveries, field and laboratory duplicate precision results, and documentation of method detection limits, instrument detection limits, and sample quantitation limits.

2. **<u>All six metals concentrations measured in "observed release" sample x111 must be disregarded, because they have not been proven "significant".</u>**

Sample x111 also cannot demonstrate an observed release of cadmium, copper, lead, mercury, nickel, and lead to surface water because the HRS Documentation Record and its supporting References fail to contain the appropriate sample quantitation limits ("SQL")

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[3] If such data were added to the record, Monsanto would request, and reserves the right, to comment on it.

and related qualifiers.[4] To establish an observed release based on sediment samples, the samples must indicate that the concentration of hazardous substances has "increased significantly" above background. HRS § 4.1.2.1.1 (Ref. No. 1 at 51,609). "Significance" must be established using the criteria in HRS Table 2-3 (Ref. No. 1 at 51,589). Table 2-3 provides, in part, that a significant increase may be established where a sample measurement equals or exceeds the SQL. If samples were analyzed pursuant to the Contract Laboratory Program ("CLP"), then the Contract Required Quantitation Limit ("CRQL," for organic substances) or the Contract Required Detection Limit ("CRDL," for inorganics) may be substituted for the SQL, if certain adjustments are made for dilution, preparation, and dry-weight conversion. *See* HRS Table 2-3 (Ref. No. 1 at 51,589); EPA Guidance Manual at 57-59.

As Menzie-Cura discusses, samples x111, x112, and x113 were analyzed using CLP methods. Sample x111 is alleged to be the release sample, but EPA failed to provide SQLs or CRDLs for all six metal substances detected in sample x111. *See* HRS Documentation Record at page 98 table & footnote *a*, footnote *b*. The footnotes state that SQLs "are not available," and that certain substitutes (other than CRDLs) were used. However, EPA's rules do not permit substitution. Moreover, SQLs should be on the QA/QC forms that are missing from the HRS Documentation Record. Thus, the EPA substituted an improper procedure for the required procedure. All six metal analyses must be disregarded.

3. **<u>All of the sampling data that EPA uses to support the alleged "observed release" of lead must be disregarded because EPA failed to account for the lead data qualifiers.</u>**

Neither can EPA use samples x111, x112, and x113 to demonstrate an observed release of lead to surface waters because the HRS Documentation Record and its supporting References demonstrate that the lead results were listed as qualified.[5] As Menzie-Cura discusses, the laboratory analysis reports for lead have a star ("*") qualifier, which is defined to mean that the duplicate precision did not meet the contract laboratory program quality criteria. Pursuant to EPA's *SI Guidance*: "Qualified data may be used only if the bias (unknown, low, high) associated with the data and the reasons for qualification are known. Some qualified data still may not be appropriate to develop a score for listing." SI Guidance at 99. However, the HRS Documentation Record and its supporting References contain nothing to justify using the lead analyses. Moreover, EPA ignored its own requirements for

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[4] If such data were added to the record, Monsanto would request, and reserves the right, to comment on it.

[5] If lead validation data were added to the record, Monsanto would request, and reserves the right, to comment on it.

using estimated concentrations. *See* Using Qualified Data to Document an Observed Release. Therefore, the lead analysis results for the release and background samples cannot be used to demonstrate an observed release.

4. **The sampling data that EPA uses to attribute PCBs to Sauget Area 1 sources must be disregarded because the record fails to contain critical QA/QC data and there are known deficiencies in the data.**

EPA attributes PCBs (Aroclor 1254 and Aroclor 1260) detected in wetlands sample x111 to Sauget Area 1 sources, based on source sampling data cited in HRS Documentation Record pages 98 to 99. Like EPA's other data, however, these data are unusable. As a threshold matter, the Documentation Record and References fail to contain critical information required to establish the validity of the data in the first instance and required by an independent observer to review EPA's decision to score an observed release to surface water. As Menzie-Cura discusses, the record fails to contain standard chromatograms, extraction information, and standard concentrations needed to assess the validity of the specific PCB results that EPA uses to attribute the "observed" release to Sauget Area 1 sources.

Moreover, the specific sampling data cited by EPA to support attribution of the PCBs must be disregarded because they do not meet the QA/QC requirements of EPA's guidelines. *See* Menzie-Cura Report at App A, § 4.1. There are serious deficiencies in the accuracy, precision, and sensitivity of the data. *Id.* at § 4.1 to § 4.4. With regard to accuracy, Menzie-Cura discusses the presence of method blank contamination causing a high bias in Aroclor 1254 data, overlapping chromatographic peaks for Aroclor 1254 and 1260 which will cause overestimation or "double counting" of PCB results, and erroneous quantitation calculations, all compounded by the absence of standard chromatograms and extraction logs. With regard to precision, Menzie-Cura discusses the absence of extraction information and standard chromatograms needed to verify the data. With regard to sensitivity, Menzie-Cura indicates that method blanks sensitivity was lower than it should have been (*i.e.*, quantitation limits were higher than method requirements) by 200% to 400%.

5. **The sampling data that EPA uses to attribute cadmium, copper, lead, mercury, nickel, and zinc to Sauget Area 1 sources must be disregarded because the record fails to contain required data usability results, several key QA/QC data, and there are known deficiencies in the data.**

EPA erroneously attributes metals (cadmium, copper, lead, mercury, nickel, and zinc) detected in wetlands sample x111 to Sauget Area 1 sources, based on source sampling data cited in HRS Documentation Record pages 98 to 99. As a threshold matter, these source data must be disregarded and cannot support attribution because the

Documentation Record and References fail to contain all the information required to establish the validity of the data in the first instance and required by an independent observer to review EPA's decision to score an observed release to surface water. As Menzie-Cura discusses, the record fails to contain a Quality Assurance plan, and fails to contain some laboratory mercury data. Menzie-Cura Report at App. A, § 6.5.

The specific sampling data cited by EPA to support attribution must be disregarded because they do not meet the QA/QC requirements of EPA's guidelines. The record fails to contain any indication that the usability of the results was evaluated pursuant to EPA's guidance documents. Menzie-Cura concludes that the data do not meet EPA's requirements for DUC-I and DUC-II standards. *Id.* at § 6.1. There are serious deficiencies in the accuracy, precision, and sensitivity of the data. With regard to accuracy, Menzie-Cura discusses high matrix spike results for nickel and mercury; inter-element interference which causes false positive results; and high bias for several cadmium and lead results. *Id.* at § 6.2. With regard to precision, Menzie-Cura indicates that lead, copper, and zinc data are significantly outside of acceptable limits. at App. B, § 6.3. With regard to sensitivity, Menzie-Cura indicate that individual sample quantitation limits are higher than the permitted contract laboratory program levels for some samples. *Id.* at § 6.4.

C. **The background samples are not appropriate to establish, and do not establish, background concentration levels.**

EPA's guidance provides: "A background level for a site provides a reference point by which to evaluate whether or not a release of a hazardous substance from the site has occurred." EPA Guidance Manual at 67. Determining accurate background concentrations is required to establish an observed release by chemical analysis. *See id.* EPA's determination of background concentrations must be "defensible." *Id.* In the present case, EPA's selection of background locations is indefensible and violates EPA's own basic requirements; if the sampling results establish anything, they actually establish that no contamination has migrated to the first downstream point of entry into a stream.

1. **The "background" samples are not "outside the influence of contamination from the site".**

EPA's guidance states that "background samples should be outside the influence of contamination from the site . . . ." EPA Guidance Manual at 67. Contradicting this guidance, EPA chose sampling locations downgradient of Sauget Area 1. In fact, according to EPA, sample x113 is from the "confluence of Dead Creek and Old Prairie du Pont Creek." HRS Documentation Record at 95. Sample x112 is in a different watershed from Dead Creek. Thus, by EPA's own rules, these two samples should be ignored and cannot be used to establish "background" samples.

It is not surprising that EPA selected x112 and x113 to deem its "background" samples, because they are clean samples. What is significant about these samples, however, and what EPA chose to ignore, is that sample x113 is in fact *downstream* from Sauget Area 1, yet it is clean. If the data are valid to establish anything, therefore, they show just the opposite of what EPA has attempted to use them to show. They establish that there has not been any migration to Old Prairie du Pont Creek. *See* Menzie-Cura Report at 8-9.

2. **The "background" samples were not collected "upstream from the potentially contaminated area".**

EPA contradicted its own rules by collecting "background" data downgradient of Sauget Area 1, and the samples therefore cannot be used to demonstrate a release. EPA's guidance states: "Background samples should be collected *upstream* from the potentially contaminated area." EPA Guidance Manual at 74 (emphasis added); *see also* Highlight 5-8 at page 75.

As Menzie-Cura discusses, sample x113 is directly downstream of Dead Creek, in the channel where the wetland empties into Old Prairie du Pont Creek. Menzie-Cura Report at 8. Sample x112 is a short distance upstream of x113, in a different watershed from Dead Creek. Neither sample — indeed *no* sample — is upstream of Sauget Area 1. EPA has impermissibly attempted to use Old Prairie du Pont Creek as a surrogate for valid upstream data, but the HRS does not allow such a substitution. Both logic and the HRS prohibit EPA's attempt to use clean downstream data to establish that hazardous substances are being released from Sauget Area 1.

3. **The "background" samples were not collected from areas chemically and physically similar to the release sample.**

EPA contradicted its own policy in another respect as well, further illustrating its use and abuse of poor data. EPA policy requires that background samples be "as similar as possible" to release samples. EPA indicates that grain size of background and release sediment samples must be the same, because different sizes (such as clay versus sand) "adsorb hazardous substances such as metals and hydrophobic organic compounds" differently. EPA Guidance Manual at 76. Further, EPA indicates that concentrations of contaminants will vary depending on whether samples are taken from quiescent zones, such as riverbanks and sandbars, or from the more turbulent parts of a stream. *Id.* Thus, EPA requires that: "Where possible . . . a background sample taken near one bank generally should not be compared with a release sample taken from the center of the main channel . . . ." *Id.* at 74.

As Menzie-Cura discusses, EPA's sampling violates all of these proscriptions, thereby precluding any comparison of samples x112 and x113 with sample x111. *See* Menzie-Cura Report at § 1.1.4. Unlike sample x111, which was taken from the center of Dead Creek, sample x112 was taken from the bank of Old Prairie du Pont Creek. *See* Ref. No. 4a at page 3-7. According to the record, samples were not taken from similar sediment types. Moreover, sample x111 was taken at a depositional depth of 0-1.5 feet, while sample x113 was taken from 0-2.5 feet. *Id.*

Moreover, as Menzie-Cura indicates, the differences among the three samples are compounded by EPA's failure to normalize them for factors such as sediment grain size and total organic carbon, which are the factors most likely to be different among samples x111, x112, and x113. As discussed above, the accepted method for establishing surface water transport gradients requires that contaminant data be normalized. *See* EPA, *Briefing Report to the EPA Science Advisory Board on the Equilibrium Partitioning Approach to Predicting Metal Bioavailability in Sediments and the Derivation of Sediment Quality Criteria for Metals* (Office of Water and Office of Research and Development, 1994).

4. EPA should have used IEPA's published soil background data for metals, instead of samples x112 and x113.

In light of all of the above deficiencies in samples x112 and x113, EPA should have used readily available soil background data for metals published by the IEPA. EPA has this data, and in fact incorporated it into the HRS Documentation Record as Reference Number 65.

As Menzie-Cura discusses, the IEPA soil background data for metals are based on hundreds of samples. Menzie-Cura Report at 10. In contrast, the two samples (x112 and x113) are far less representative of area soil concentrations. The IEPA data reveals that soil background levels in Sauget are *much higher* than the purported background levels established by samples x112 and x113. When compared to sample x111, the IEPA background data demonstrates that at least two of the substances in x111 do not meet the HRS requirements for scoring an "observed release."

III. EPA INCORRECTLY SCORED A "DRINKING WATER THREAT"

Another error by EPA was in attempting to assign any "Drinking Water Threat" score for Sauget Area 1. *See* HRS Documentation Record at 4, 105. As Menzie-Cura discusses, exposure to substances from Sauget Area 1 through drinking water is not an issue. Menzie-Cura Report at 16. It was improper for EPA to assign any "Drinking Water Threat" score because it has been established that there is no threat to drinking water in the vicinity of Sauget Area 1. The extremely low score that EPA did in fact assign to this component serves only to confirm that no drinking water threat exists. Drinking water for this area is derived exclusively from the Mississippi River *upstream* of the sites. As the Documentation Record acknowledges, any downstream intakes are at least 20 to 64 miles away and not conceivably influenced by Dead Creek. Even though removal of this score component will have only a minor effect on the overall site score, it is highly misleading for EPA to be alleging that *any* threat to drinking water exists — even one of the de minimis level alleged by

EPA in the ranking package — when in fact no threat exists. Accordingly, this factor should have been scored zero.

IV. EPA MISCALCULATED THE SURFACE WATER PATHWAY "WASTE CHARACTERISTICS" VALUE

EPA miscalculated the surface water overland flood migration component "Waste Characteristics" by overstating the "Hazardous Waste Quantity." *See* HRS Documentation Record at page 4, Lines 7-8; 5, Lines 16-17; 6, Lines 24-25. EPA overstated the Hazardous Waste Quantity in three ways. First, EPA erroneously included the contaminated sediments that were removed from Source 1 in a major 1990 cleanup supervised by IEPA. Second, if one were to assume contrary to all common sense that Source 1 should be counted for the sake of argument, EPA still overstated the Source Hazardous Waste Quantity values for Source 1 and Source 8.[6] *See* HRS § 2.4.2.1.5 (Ref. No. 1 51,591). The underlying cause for this chain of errors was that EPA incorrectly classified Sources 1 and 8 as surface impoundments. *Id.* at § 2.4.2.1.1 & Table 2-5. Third, EPA incorrectly included in the Hazardous Waste Quantity surface water sediments contaminated by migration, from Source 1, Source 3, and Source 8. *Id.* at § 1.1, page 51,587.

EPA incorrectly estimated the Source Hazardous Waste Quantity value for Source 1 as 8,009.62; however, since the wastes that already have been removed from Source 1 should not be counted for this proposed NPL listing, the correct value for Source 1 is zero. If, for the sake of argument, the prior cleanup were ignored, then the quantity estimated for Source 1 still would have to be corrected in light of EPA's incorrect classification of it as a surface impoundment; the corrected value based on EPA's estimated area would be 30.625. EPA also used the incorrect surface impoundment classification to estimate the Source Hazardous Waste Quantity value for Source 8 as 4,553.85; the corrected value based on EPA's estimated area is 17.41. These corrections by themselves (regardless of whether the Source 1 value is corrected to 0 or 30.625) will reduce the Hazardous Waste Quantity from 10,000, as EPA calculated it, to 100. *See* HRS Documentation Record at 104; HRS § 2.4.2.2 & Table 2-6. In turn, the corrected Hazardous Waste Quantity value will reduce the Drinking Water Threat Waste Characteristics from 100, as EPA calculated it, to 32; reduce the Human Food Chain Threat Waste Characteristics from 1,000, as EPA calculated it, to 320; and reduce the Environmental Threat Waste Characteristics from 1,000, as EPA calculated it, to 320. *See* HRS Documentation Record at 4; HRS § 2.4.3.1, § 2.4.3.2 & Table 2-7.

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6 Use of the alleged "Source 1" is inappropriate and grossly distorts the overall Sauget Area 1 ranking. Reliance on the already-remediated "Source 1" as a source misleads area residents by suggesting that the area should be a Superfund site when it had in fact been cleaned up years ago.

A. <u>EPA incorrectly counted Source 1, which was cleaned up in 1990.</u>

As Menzie-Cura discusses, Monsanto and Cerro Copper spent close to $13 million in 1990 to clean Creek Segment A, under the supervision of IEPA. EPA acknowledges this in the scoring package, stating: "A total of 27,500 tons of contaminated sediments were removed from Source 1 and disposed of at several hazardous waste landfills." HRS Documentation Record at 23 (citation omitted). The creek was backfilled, lined with a plastic vapor barrier, topped with an engineered cover, and is now used as a parking lot. Yet, in scoring Sauget Area 1, EPA treats this major initiative as though it had never taken place.

In light of the cleanup, proposing to list Creek Segment A is not only inappropriate, but also contradicts EPA's common sense Superfund reforms. Administrator Browner, on October 2, 1995, announced that as part of Superfund reforms designed to "make smarter cleanup choices that protect public health at less cost," EPA was revising its policy to take into account current or recent response actions when listing a site on the NPL. *See EPA Fact Sheet on Administrative Changes to be Implemented to Reform Superfund Program* (Oct. 2, 1995), *reprinted in* 191 Daily Env't Rep. (BNA) E-1 (Oct. 3, 1995). *See also* Memorandum from Stephen D. Luftig, Director, EPA Office of Emergency and Remedial Response, to Jerry Clifford, Director, EPA Office of Site Remediation Enforcement, regarding Superfund Reforms Implementation Plan (Dec. 6, 1996), *reprinted in* 239 Daily Env't Rep. (BNA) E-1 (Dec. 13, 1995). The purpose of this reform is to "provid[e] incentives for voluntary cleanup, and encourag[e] reuse or redevelopment of the property." *Id.* at *EPA Fact Sheet*. In particular, this reform is "designed to eliminate disincentives for early response actions by . . . private parties at sites being considered for the NPL . . . ." *Guidance Due On Response Actions Before Listing of Contaminated Sites*, 27 Env't Rep. (BNA) 451 (June 14, 1996). This policy was scheduled to be published in final form in August 1996, but the date recently slipped to September 1996. *See* EPA, *Superfund Reform Scorecard of Third Round* (June 1996).

B. <u>EPA incorrectly classified Source 1 and Source 8 as surface impoundments.</u>

EPA overstated the source hazardous waste quantities for Source 1 and Source 8 because it classified these areas as surface impoundments. Hazardous waste quantity is estimated using one of four increasingly imprecise methods listed in the HRS. In descending order of precision, the methods are hazardous constituent quantity, hazardous wastestream quantity, volume, and area. *See* HRS § 2.4.2 et seq. (Ref. No. 1 at 51,590-91). EPA chose to estimate the hazardous waste quantities by using the area method. *See* HRS Documentation Record at 29, 36, 42, 51, 58, 74, 81, 88. When using the area method, the hazardous waste quantity is derived by dividing the estimated area by a divisor that varies depending on the type of source. The divisor for sources classified as contaminated soil is 34,000. By contrast, the divisor for surface impoundments is only 13. *See* HRS § 2.4.2.1.1 at Table 2-5 (Ref. No.

1 at 51,591). Thus, by classifying Sources 1 and 8 as impoundments, EPA inflated their estimated hazardous waste quantities by a factor of over 2,600 times the correct amount.

As Menzie-Cura discusses, EPA erred because Sources 1 and 8 are not surface impoundments and — if they are sources at all — should be classified as contaminated soil. Menzie-Cura Report at §1.2.1, § 1.2.2. To be a "surface impoundment," as that term is defined in EPA's HRS guidance, requires that a depressed, excavated, or diked area be "*designed* to *hold* accumulated liquid wastes."[7] EPA Guidance Manual at 43 (emphasis added). On the other hand, "contaminated soil" is defined as a soil underburden onto which a hazardous substance has been "spilled, spread, disposed, or deposited." *Id.* at 42. The soil was not intended for holding waste, and it did not *contain* or *accumulate* wastes for extended periods of time. Since the concentration of wastes is lower for contaminated soil, the area divisor is relatively larger. *See* HRS § 2.4.2.1.1.

Sources 1 and 8 do not meet the definition of surface impoundment because they were not designed to hold accumulated liquid wastes. Source 1 is the remaining head of Dead Creek. *See* HRS Documentation Record at 19-20. As part of Dead Creek, Source 1 was not "designed" to "hold" anything and in fact did not "hold" anything. EPA does not allege either that the Creek was designed to hold wastes or that wastes were accumulated — held or contained — in the Creek. In the HRS Documentation Record, EPA alleges just the opposite. EPA alleges that waste from purported "Source 1" was simply flowing down the Creek prior to the 1970's. In the early 1970s, EPA alleges, the culvert at the south end of Source 1 was sealed, and the head of Dead Creek was regraded to divert stormwater flow to the north to its ultimate discharge to the Sauget Wastewater Treatment Plant. Ref. No. 3b at 32-33. Thus, according to the HRS Documentation Record itself, Source 1 has at all times continued to flow to different discharge points. Such an allegation is flatly inconsistent with EPA's allegation that this purported "source" was an impoundment of any kind. Source 1 is not and never was an impoundment and should not be scored on that basis.

Similarly, Source 8 is a small, inactive sand mining pit. *See* HRS Documentation Record at 75-76. The pit was not designed to hold accumulated liquid wastes, and there is no documentation or allegation that wastes were discharged to the pit. *See id.*; *see also* Ref. No. 3b at 50. In fact, IEPA indicated that while there is some "trash and debris" on the east bank of the pit, there is "no evidence of [hazardous] waste disposal" into the pit. Ref. No. 3A at page 2-14. Moreover, the pit does not in fact hold accumulations of water or any other liquid, since EPA alleges that it freely flows into Dead Creek through a channel. *See*

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7 Thus, a source that is designed for holding an accumulation of liquid wastes will have a relatively large quantity of the concentrated wastes for a given surface area, and the waste will be present there over an extended period of time.

HRS Documentation Record at 75-76. Thus, like Source 1, Source 8 does not meet that definition of surface impoundment.

By classifying Sources 1 and 8 as "contaminated soil," the hazardous waste quantity score for Source 1 should be no greater than 3.06 and for Source 8 should be no greater than 1.74.

Even IEPA itself apparently believes it is appropriate for Source 1 — and indeed, all of the Dead Creek "sources" — to be categorized as "contaminated sediments." IEPA categorized these "sources" as "contaminated sediments" in its 1992 *CERCLA Screening Site Inspection Report*. *See* Ref. No. 4a at page 2-2. EPA's reclassification of these sources is blatant scoring manipulation.

C. EPA erred by including Source 1, Source 3, and Source 8 in the net Hazardous Waste Quantity values because it incorrectly counted sediments contaminated by migration.

EPA overstated the Hazardous Waste Quantity because it incorrectly included the quantity of wastes estimated to exist in Source 1, Source 3, and Source 8. The HRS provides that hazardous waste quantities are evaluated only for "each source (or area of observed contamination)." HRS § 2.4.2 (Ref. No. 1 at 51,590). "Source" is defined as an area where a hazardous substance has been placed. *Id.* at § 1.1, page 51,587. The definition excludes "surface water sediments that have become contaminated by migration . . . ." *Id.* Sources 1, 3, and 8 are contaminated by migration from adjacent areas. Moreover, EPA's guidance states that areas of observed contamination are "evaluated only in the soil exposure pathway," EPA Guidance Manual at 41, but EPA impermissibly used them here in connection with the surface water pathway.

Elimination of a Source Hazardous Waste Quantity value for Source 3 does not further reduce the other values, because EPA only assigned Source 3 a value of " >0 ." However, this third error is important to note because it applies to all three areas even if the cleanup of Source 1 were ignored and even if Source 1 and Source 8 were considered to be surface impoundments.

V. EPA MISCALCULATED THE SURFACE WATER PATHWAY "TARGETS" VALUES

A. EPA incorrectly assigned a value for the Human Food Chain Threat "Food Chain Individual".

EPA incorrectly assigned a value of 20 for the Human Food Chain Threat "Food Chain Individual." *See* HRS Documentation Record at page 5, Line 18. The HRS provides that a value of 20 should be assigned only "if there is an observed release of a hazardous substance having a bioaccumulation potential factor value of 500 or greater to surface water in the watershed and there is a fishery (or portion of a fishery) present anywhere within the target distance limit . . . ." HRS § 4.1.3.3.1 (Ref. No. 1 at 51,620). As discussed above at section II of these Comments, EPA cannot demonstrate an observed release. Therefore, EPA's assignment of a value of 20 for the "food chain individual" score is erroneous.

The high target value calculated by EPA contradicts the low threat actually posed by Sauget Area 1. There is in fact no significant bioaccumulation occurring. Menzie-Cura indicates that EPA failed to take into account evidence collected by IEPA, and IEPA's determination "that, for several organic compounds including total PCBs, the local fish population is not accumulating these substances above United States Food and Drug Administration (FDA) Action Levels." Menzie-Cura Report at 16. IEPA's survey "demonstrated that the concentrations of several organic contaminants in fish tissue in Prairie du Pont Creek are similar to the background fish tissue bioaccumulation of organic contaminants in fish throughout the American Bottoms. In particular, these data show that there is no transport and uptake of PCBs to the biota of the Prairie du Pont Creek from any upstream sources in excess of local background in the American Bottoms." *Id.*

B. EPA incorrectly assigned a value for the Environmental Threat "Sensitive Environments - Level II Concentrations".

EPA also incorrectly assigned a value of 50 for the Environmental Threat "Sensitive Environments — Level II Concentrations." *See* HRS Documentation Record at page 6, Line 26b. The HRS provides that a Level II Concentrations value should be assigned only if there is an observed release. *See* HRS § 4.1.4.3.1., § 4.1.2.3 (Ref. No. 1 at 51,625, 51,613). As discussed above at section II of these Comments, EPA cannot demonstrate an observed release. Therefore, Level II Concentrations are inapplicable.

Assigning any Level II Concentration or Potential Contamination value would contradict the low threat actually posed by Sauget Area 1. In addition to the low bioaccumulation documented by IEPA (see above at section V(A)), Menzie-Cura's Report at Appendix B indicates that "[r]ecent observations of Sauget Area 1 and its target areas characterize them as ecologically diverse with no evidence of ecological stress. . . . These are areas which support significant wildlife, including various predatory water birds." Menzie-Cura Report at 16-17; Menzie-Cura Report at App. B.

VI. EPA FAILED TO ESTABLISH AN "OBSERVED RELEASE" TO AIR

One of EPA's major errors was its mistaken finding of an "Observed Release" for the air migration pathway. *See* HRS Documentation Record at page 7, Line 1. As in its erroneous conclusion that there was an "observed release" to surface waters, EPA's conclusion is based on data inaccuracies and other violations of its own policies and guidelines.

EPA hinges its entire conclusion that there has been an observed release on one isolated accident in which a worker assisting in securing Source 6 drilled an 8 foot deep hole through the surface of the landfill and forcibly punctured and entered a sealed drum containing liquids. The landfill is closed, graded, level, and covered with rock. HRS Documentation Record at 61. The hole was being drilled to install a security camera surveillance system for the site. Ref. No. 19, 20. As part of the security measures, the site was enclosed by an 8 foot high chain link fence topped with barbed wire. The security worker was directly over the hole during the incident. Ref. No. 19. The Illinois Department of Public Health ("IDPH") concluded that the security worker may have not been wearing gloves, and that he may have "contacted the waste directly by trying to free a metal fragment (drum lid?) from the augur." Ref. No. 21 at 2. IDPH further concluded that this was a "one-time relatively short exposure to compounds in common use." Ref. No. 21 at 4.

After contact with the augur, the worker reportedly complained of dizziness and tightness in his chest. Ref. No. 19 at 1. IDPH concluded that the worker did not become disoriented and did not lose consciousness. Ref. No. 21 at 2. IDPH stated: "The most likely scenario would have the drill bit penetrate the barrel and release the contents as well as any pressure that might have accumulated. The loosened dirt atop the auger and the auger itself would have effectively prevented any escape of materials until the auger was removed from the hole. At that point those compounds of sufficient volatility would escape from the hole as vapor." Ref. No. 21.

After the worker was taken to a hospital for observation, the hole was "filled in to prevent any other vapors from escaping." Ref. No. 20 at 1. That evening, a soil sample was taken off the drill bit and analyzed. *Id.* at 2. Five days later, the hole was re-drilled, sampled for IEPA, and re-sealed with grout. *Id.*

The administrative record does not make any claim that any hazardous substances were measured in the air during or subsequent to this accident. The allegation of exposure — and of an observed release — springs only from the worker's alleged symptoms and from subsequent sampling from the drum itself. EPA does not, in fact, claim to have ever measured a single hazardous substance in the air attributable to Sauget Area 1.

A. <u>CERCLA excludes the worker accident from the definition of "release".</u>

CERCLA itself precludes EPA from treating the unusual accident as an "observed release." The worker accident cannot involve an "observed release" because CERCLA specifically *excludes* from the definition of "release" "any release which results in exposure to persons solely within a workplace." 42 U.S.C. § 9601(22)(A). The worker exposure — if indeed there was any exposure — falls within this exclusion. The worker was at work at the time of the accident, and the location of the alleged exposure was his workplace. There is no evidence that any other person — including other individuals located in the immediate vicinity of the worker — had any exposure. There is certainly no evidence that any person at any other location experienced any exposure. Hence, even if there was some exposure to the worker — which has not been demonstrated — any such exposure was solely within his workplace.

B. Drilling through a buried drum while installing site security does not constitute a release to air.

EPA obtains the critical "observed release" score for the HRS air scoresheet by mischaracterizing this single worker accident. There is no allegation of any other incident involving an alleged release to air for any of the nine sources. Observed releases can be demonstrated through direct observation, air sampling, or inference. HRS § 6.1.1 (Ref. No. 1 at 51,651). Not one incident of direct observation of an air release is alleged or documented, for all of the decades during which Sauget Area 1 has been studied. While air sampling has been performed at Sauget Area 1, EPA does not allege that the results support an observed release.

EPA instead relies on the least reliable support: inference. In doing so, however, EPA misapplies its own guidelines. Its guidelines provide that visual evidence of a release is "preferable." EPA Guidance Manual at 398. Alternatively, the guidelines provide that documentation can be used to document historical releases. *Id.* Lastly, the guidelines provide an example where a release can be validly inferred:

> For example, if available evidence demonstrates that two substances, which may react to form a poisonous gas, are present in an open surface impoundment, an adverse effect that would satisfy the criteria for an observed release would be an individual at the site overcome by fumes from the impoundment. Even if the fumes were invisible (and thus could not be "seen"), an observed release by direct observation could be established based on demonstrated adverse effects (e.g., a hospital report stating that a person was overcome by fumes containing a hazardous substance).

EPA Guidance Manual at 399 (original emphasis removed).

As EPA's example shows, an "observed release" is an incident that reflects the true risk that the site poses to the target population. Open surface impoundments may involve such risk, as do other forms of unconfined waste disposal. In the EPA Guidance Manual's example, the adverse effect experienced by the individual simply documents or provides evidence of a release which is occurring from the impoundments in their usual condition. The hypothetical impoundments referred to in the EPA Guidance Manual are clearly a continuing source of vapors. The same would be true if, for example, an individual walking across an open field were overcome by vapors emitted by bulk liquids buried in an unconfined fashion under that field. In both situations, the human reaction is used to evidence the existing exposure.

The security worker accident demonstrates just the opposite. It could not establish more clearly the *absence* of any existing exposure from Sauget Area 1, and in particular Source 6. With the possible exception of this one accident and, as noted below, it is total speculation whether the worker was affected by anything in the air, the record is silent on any adverse effect on the air from the fenced site. The record does not even mention the existence of any odors. Even the workers working on the property had no hint of adverse effect until one drilled directly through a drum and, without using even the most basic safety precaution (gloves) began touching with his bare hands buried waste that had been brought up on the augur.

EPA concedes that the liquids allegedly present in the drum were inaccessible to the environment because they were in a sealed drum buried 8 feet below a fenced, graded, leveled, graveled surface. The liquids were freed only because the site was being secured. Even after the drum was drilled through, no vapors could have entered the atmosphere until the drill bit and overburden were removed from the borehole. The alleged vapors were again confined when the borehole was refilled with dirt. Moreover, it was not even conclusively established whether the worker was affected by direct contact with the liquids or by inhalation of vapors. In short, it was never established whether there were any vapors at all. EPA's finding is based on complete speculation.

As Menzie-Cura discusses, the security worker accident does not represent general site conditions at Source 6 or the other eight sources. Menzie-Cura Report at § 1.5. The recovery of liquids from the buried drum was the result of intrusive activities inside a fenced security zone. The soil samples collected to document this purported release were also collected at considerable depth below surface (8 to 13 feet), and demonstrate the absence of any true release to the atmosphere.

Everything about this incident illustrates not how the site is releasing anything into the air, but how any substances at the site are contained and isolated. If EPA can determine from this incident that there was an "observed release" to the air, EPA could manufacture such a release at virtually any site by indiscriminately punching holes into drums buried deep below the surface. Such an interpretation would render an "observed release" meaningless, and would allow the air pathway to serve as nothing more than a license for EPA to list any site of its choosing. To determine from this unusual incident that there is an observed release of hazardous substances from Sauget Area 1 into the air is arbitrary, capricious and an abuse of discretion.

C. <u>**The samples used to establish an "observed release" did not follow proper protocol.**</u>

The comments set forth in section II(B), above, are incorporated here. Even by speculating that an observed release occurred to the air, EPA still was forced to rely on bad data in its effort to establish the constituents of that imagined release. EPA manifested total disregard for the quality of the data it used in supporting its inference that an "observed release" occurred to air, in direct contravention of the NCP and numerous EPA guidelines that set forth data quality requirements. EPA's guidelines require that the HRS Documentation Record contain the data necessary for an independent observer to replicate the scorer's determination that the supporting data is valid. *See e.g.* EPA Guidance Manual at 27. In particular, EPA requires the use of "accepted monitoring, sampling, and analysis methods" equivalent to EPA standards to demonstrate an observed release to air. EPA Guidance Manual at 401. As Menzie-Cura discusses, the data do not meet DUC-I or DUC-II level requirements, thus violating EPA's requirements pursuant to *Guidance for Performing Site Inspections Under CERCLA*. *See* Menzie-Cura Report at App. A, § 8.1.

EPA relies on two sampling analysis reports to support the inferred air release. *See* Ref. No. 52 (Environmetrics report on augur soil sample); Ref. No. 53 (Applied Research & Development Laboratory report on re-boring sample). As Menzie-Cura discusses, the analyses of soil taken from the auger have "no documented quality control." Menzie-Cura Report at App. A, § 8.1. The results are labeled as "qualitative," but have no validation information, no dilution factors, no quality control results, and no blank reports. *Id.* at § 8.2. Menzie-Cura conclude that these "data should not have been presented in the HRS as they are unsupported by adequate QC . . . ." *Id.*

As Menzie-Cura discusses, much of the data from the re-boring are "imprecise and inaccurate based upon numerous failed" quality controls. *Id.* at § 8.1. Menzie-Cura note that the re-boring results are accompanied by a letter stating that IEPA validated the data, but that the HRS Documentation Record fails to include a laboratory data package. *Id.* at § 8.2. Menzie-Cura discusses numerous technical grounds for its conclusion that the sampling analyses fail EPA's general QA/QC requirements for accuracy and precision and EPA's specific rules for using qualified data. *See id.* at § 8.2, § 8.3.

VII. EPA MISCALCULATED THE AIR PATHWAY "WASTE CHARACTERISTICS" VALUE

The comments set forth in section IV, above, are incorporated here. EPA miscalculated the air pathway "Waste Characteristics" value by overstating the "Hazardous Waste Quantity." *See* HRS Documentation Record at page 7, Lines 4-6. As discussed above, the reasons EPA overstated the "Waste Characteristics" value were that, first, EPA overstated the Source Hazardous Waste Quantity values for Source 1 and Source 8, and second, EPA incorrectly included in the Hazardous Waste Quantity surface water sediments contaminated by migration, in Source 1, Source 3, and Source 8.

As discussed above, the correct Hazardous Waste Quantity should be no more than 100. *See* HRS Documentation Record at 104; HRS § 2.4.2.2 & Table 2-6. In turn, the corrected Hazardous Waste Quantity value will reduce the Air Pathway "Waste Characteristics" value from 56, as EPA calculated it, to 18. *See* HRS Documentation Record at 7; HRS § 6.2.3; § 2.4.3.1 & Table 2-7.

VIII. EPA MISCALCULATED THE AIR PATHWAY "TARGETS " VALUE

EPA miscalculated the air pathway "Targets" value by overstating the "Population" value. *See* HRS Documentation Record at page 7, Lines 8d, 11. EPA first determined the resident population using a calculation never detailed in the HRS Documentation Record. EPA's failure to explain its calculation precludes any attempt to evaluate the accuracy of EPA's numbers.

EPA then added to the resident population a figure that was supposed to represent employment at the nearby Cerro Copper and Monsanto factories. Even in determining population figures, EPA used bad data. EPA overstated the population score for at least two reasons, both related to its addition of the employment numbers. First, EPA relied on incorrect general corporate directory information to establish the number of employees at these plants. *See* HRS Documentation Record at 148; Ref. No. 23. EPA incorrectly assumed that there are 1,650 workers at the Cerro Copper and Monsanto Krummrich plants. *Id.* In fact, there are at most 1,405 workers at those two facilities. The attached Affidavit of Russell Sackett, Plant Manager of the Monsanto plant (Exhibit 3), states that Monsanto has 525 workers. The attached Affidavit of Joseph M. Grana, Manager of Environmental, Energy & Health Services Group of the Cerro facility (Exhibit 4), indicates that Cerro has a year to date average of 875 to 880 workers. These specific, sworn statements contradict the general directory information used by EPA.

By applying these correct, lower numbers, to EPA's population calculation, it becomes clear that EPA incorrectly estimated the Air Pathway "Potential Contamination" population value as 169; the correct value is no higher than 79. *See* HRS § 6.3.2.4 (Ref. No. 1 at 51,661); HRS Documentation Record at 148. In turn, the net Targets value must be reduced from 195, as calculated by EPA, to a corrected value of 105.

EPA's second error was in failing to consider whether any of the employees at Cerro or Monsanto were also residents included in EPA's residential population within the radius evaluated. Overlap seems highly likely, and any overlap amounts to the double-counting of individuals as both residents and employees. For this reason as well, EPA's population score is highly inflated. Because EPA did not share its calculation of the residential population score, however, it is impossible to determine the extent of the overlap or the amount of the population overstatement caused by double-counting.

IX. EPA MISCALCULATED THE "HRS SITE SCORE" BECAUSE SAUGET AREA 1 WAS IMPROPERLY AGGREGATED

Aggregating the nine disparate sites for this HRS scoring was yet another fundamental error committed by EPA. Aggregation, among other things, leads to the absurd result of proposing to include on the list of the nation's top priorities for cleanup a "source" ("Creek Segment A," which EPA calls "Source 1"), which Monsanto and Cerro Copper have already voluntarily spent close to $13 million to clean, fill, line, and cover, under IEPA's supervision. It also led to the absurd result of aggregating into Sauget Area 1 the "tail" of Dead Creek — an alleged "source" ("Source 3") with no quantifiable waste volume.

EPA violated its own policy by aggregating the nine sites for this HRS scoring. *See Linemaster Switch Corp. v. EPA*, 938 F.2d 1299, 1309 (D.C. Cir. 1991) (EPA's policy excludes from aggregation sites that entail multiple waste generators, more than one type of waste, or more than one potentially responsible party). EPA's policy on site aggregation states: "For purposes of the NPL, EPA has decided that in most cases *such sites should be scored and listed individually because the HRS scores more accurately reflect the hazards associated with a site if the site is scored individually.*" 48 Fed. Reg. 40,658, 40,663 (Sept. 8, 1983, emphasis added) ("Aggregation Policy").

Moreover, EPA's Aggregation Policy indicates that aggregation is not justified merely because EPA anticipates a consolidated response action; such consolidation can be done after the listings. In particular, EPA reserves its option to "decide to coordinate the response to several sites listed separately on the NPL into a single response action when it appears more cost-effective to do so." *Id.* EPA has indicated in several other policy statements that it may place sites individually on the NPL, yet combine their remedy. *See NPL Amendment*, 49 Fed. Reg. 37,070, 37,076 (Sept. 21, 1984); *Interim RCRA/CERCLA Guidance on Non-Contiguous Sites and On-Site Management of Waste and Treatment Residue*, 1986 Westlaw 295950 at *4 (Criteria for Treating Non-Contiguous Sites as One) (OSWER Directive 9347.0-01, Mar. 27, 1986). In discussing its policy for aggregating individually listed sites for the purpose of a combined remedy, the Agency stated that: "EPA applies more restrictive criteria to potential site aggregations for the purposes of NPL listings." 55 Fed. Reg. 8,666, 8,690 n.5 (Mar. 8, 1990).

A. Disaggregating the sites more accurately reflects the hazards associated with them.

Lacking information that could even arguably support HRS scores of 28.5 or higher for each of the nine sites, EPA improperly aggregated them. The result of aggregation is that the potential environmental threats from each of the nine sites are grossly exaggerated.

As the most egregious example, Source 1 is tainted by aggregation with the other sites, even though it has been successfully cleaned up under IEPA's supervision. EPA's scoring package treats Source 1 as if it were still a creek segment containing water and sediments, whereas in reality the sediments have been removed and disposed of at hazardous waste landfills, the creek has been filled and covered, and the site has been redeveloped as a parking lot. It is arbitrary and capricious, and an abuse of discretion, for EPA to blind itself to the current status of this purported source in ranking it for the NPL.

Aggregation taints each of the nine sites with the single, accidental drum puncture, incorrectly scored as an "observed release" to air. See section VI, above. This purported release occurred at Source 6, where a drum buried at the Area 6 landfill was drilled into in the process of securing the landfill. There is no relationship between this purported release and any of the other sites. For instance, the $13 million dollar cleanup of Source 1 included installing a plastic vapor barrier designed to prevent any possibility of an air release. Moreover, despite several decades of scrutiny of the other sites, including air sampling, EPA does not allege any observed air releases for any of the other sites.

Aggregation also taints each of the nine sites with the single, incorrectly scored "observed release" to water in the wetland sample. See section II, above. EPA strained to demonstrate an observed release to water based on one defective release sample and two defective "background" samples. EPA compounds this error by attempting to apply its defective conclusion to all nine sites, without properly attributing the alleged release to any one of them.

Aggregation further taints each of the nine sites with inflated values for hazardous waste quantity. Assuming for the sake of argument that EPA correctly estimated the quantities for each site, the Source Hazardous Waste Quantity Values for the individual sites range from " >0 " at Source 3 to 8,009.62 at Source 1. *See* HRS Documentation Record at 104.

B. <u>The sites were not part of the same operation.</u>

EPA's Aggregation Policy provides that two sites may be aggregated if, among other common factors, they were part of the same operation which deposited similar substances using similar means of disposal. However, Sauget Area 1 includes nine distinct areas, most of which EPA alleges were affected by numerous different operations. EPA alleges that Source 1 was "purchased by Cerro Copper and its predecessors in stages beginning in 1927 and ending in 1969." HRS Documentation Record at 19. EPA alleges that Source 2 received wastes from Source 1, Midwest Rubber Company, Waggoner Trucking Company, and five other sources. *Id.* at 30-31. EPA alleges that Source 4 was owned and operated variously by Leo Sauget, Cerro Copper, Wiese Engineering Company, and Emily and Myrtle Hankins. *Id.* at 43. EPA alleges that Source 5 was owned and/or operated variously by Leo Sauget, Monsanto, and other identified purchasers of portions of the site, *id.*

at 53; however, EPA also indicates that it is guessing whether Monsanto disposed of wastes at either Source 5 or Source 6. *See id.* at 53, 60. EPA alleges that Source 7 was owned and operated variously by Waggoner Trucking Company, Ruan Trucking Company, and Metro Construction Company. *Id.* at 67. EPA alleges that Sources 8 and 9 were owned and/or operated by H.H. Hall Construction Company. *Id.* at 75, 82. In fact, even though Sources 8 and 9 are owned by the same company, IEPA concluded that these sources "do not meet requirements for site aggregation." Ref. No. 3A at page 2-1. EPA's own descriptions could not demonstrate more clearly that the distinct areas were *not* all part of the same operation.

C. <u>Substances at the sites were not deposited using similar means of disposal.</u>

EPA's Aggregation Policy provides that two sites may be aggregated if, among other common factors, they were part of the same operation which deposited similar substances using similar means of disposal. However, Sauget Area 1 includes nine distinct areas, which EPA alleges used varying different means of disposal. EPA alleges that substances were disposed of at Sources 1, 2, 7, and 8 in surface impoundments; that substances were disposed of at Sources 4, 5, 6, and 9 in landfills; and in Source 3 as contaminated soil. Moreover, the various purported "surface impoundments" and "landfills" were used in widely different manners. For instance, Source 1 is allegedly a surface impoundment because its flow was directed after substances were discharged to it, while Source 7 is allegedly a backfilled surface impoundment to which wastes were discharged, and Source 8 is allegedly a surface impoundment because it is an inactive sand pit. The landfills were allegedly operated in widely different ways. *See* HRS Documentation Record at 43, 52, 59, 82.

D. <u>EPA did not demonstrate that similar substances were deposited at each of the nine sites.</u>

EPA's Aggregation Policy provides that two sites may be aggregated if, among other common factors, they were part of the same operation which deposited similar substances using similar means of disposal. However, EPA fails to demonstrate that similar substances were deposited at the nine sites in Sauget Area 1. The sampling data relied upon by EPA may indicate some overlap in substances found at some of the nine sites, but that does not demonstrate whether those substances were deposited at each of the sites or migrated to them. Moreover, as discussed in section II(B) above, all of the data must be disregarded because they fail to meet numerous HRS protocol and quality control requirements.

E. <u>A single strategy for cleanup is not appropriate for all nine sites.</u>

EPA's Aggregation Policy provides that two sites may be aggregated if, among other common factors, a single strategy for cleanup is appropriate. A single strategy for cleanup is not appropriate for the nine sites in Sauget Area 1. No cleanup is appropriate for purported "Source 1," since it was already remediated in 1990 under IEPA's supervision.

With regard to the other sites, at a minimum, different methods would have to be used for the "impounded" sections of Dead Creek, the other impoundments, the landfills, and the areas of contaminated sediment. Moreover, Source 7 has been backfilled and covered. HRS Documentation Record at 67.

F. <u>The sites do not all involve the same potentially responsible parties.</u>

EPA's Aggregation Policy provides that two sites may be aggregated if, among other common factors, they involve the same potentially responsible parties ("PRPs"). The nine sites in Sauget Area 1 involve a large number of different PRPs. *See* section IX(B), above.

X. CORRECTLY SCORED, SAUGET AREA 1 SITES DO NOT HAVE THE MINIMUM 28.50 SCORE REQUIRED FOR NPL LISTING

Menzie-Cura rescored Sauget Area 1 in light of the corrections discussed above. *See* Menzie-Cura Report at § 2,0, § 2.1 & related attachments. Using the corrections as applied to the aggregated nine areas, and using highly conservative assumptions, Menzie-Cura demonstrates that the correct score should be no higher than 8.92. This corrected score for the aggregated nine areas is far below the minimum 28.50 score required for NPL listing.

Menzie-Cura also applied the corrections to the nine disaggregated areas. The corrected scores for the nine disaggregated areas ranged from 0 for Source 3 to no higher than 8.92 for Source 2. All of the nine disaggregated area scores are far below the minimum 28.50 score required for NPL listing.

Menzie-Cura also calculated several alternative scores for the sites as aggregated and disaggregated, using numerous combinations of accepting only some of the corrections. Every alternative combination yielded a score far below the minimum 28.50 score required for NPL listing.

XI. EPA'S LISTING VIOLATES DUE PROCESS

The HRS ranking process and NPL listing process deprive Monsanto of its property without due process of law. As an alleged potentially responsible party, Monsanto is being deprived of property including, but not limited to, the following: (1) Monsanto's reputation in the business community and among residents of Sauget and Cahokia, Illinois area; (2) the value of the Monsanto Krummrich Plant property, which has been diminished by the proposal to list the Sauget Area 1 sites and which would be diminished further if the NPL listing were finalized; and (3) the costs of cleanup for Sauget Area 1. This deprivation is without due process of law for reasons including, but not limited to, EPA's failure to provide Monsanto with a full evidentiary hearing, including an opportunity to cross-examine EPA's witnesses, and an adequate opportunity to present justifications for abandoning the listing process.

XII. CONCLUSION

For all of the reasons specified above, the listing of Sauget Area 1 would be arbitrary and capricious and an abuse of discretion. Monsanto therefore requests that EPA not finalize the NPL proposal of Sauget Area 1 and that EPA remove Sauget Area 1 from the list of proposed NPL sites and from any further consideration for listing

Respectfully submitted,

James W. Moorman

James W. Moorman
Laurence S. Kirsch
Jonathan R. Stone
Counsel for Monsanto Company

Enclosures

Exhibit 1

Technical Report —
Comments on Sauget Area 1 HRS Scoring
(Menzie, Cura & Associates, Inc., Sept. 12, 1996)

is bound separately.

HAZARDOUS WASTE RESEARCH AND INFORMATION CENTER

1808 Woodfield Drive
Savoy, Illinois 61874

HWRIC RR-030

Historical Assessment of Hazardous Waste Management in Madison and St. Clair Counties, Illinois, 1890-1980

by

Craig E. Colten

with cartography by

Ted B. Samsel

Illinois State Museum

Springfield, Illinois 62706

Reprinted February 1990

Printed October 1988

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recommendation for use.

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List of Abbreviations

E&E - Ecology and Environment, Inc.
ESL - East St. Louis
ESL&SD - East Side Levee and Sanitary District
FWP - Federal Writers' Project Manuscripts, Illinois State Historical Library, Springfield, Illinois
HWRIC - Hazardous Waste Research and Information Center
IDPH - Illinois Department of Public Health
IEPA - Illinois Environmental Protection Agency
ISA - Illinois State Archives, Springfield, Illinois
ISGS - Illinois State Geological Survey
ISHD - Illinois State Health Department
ISWB - Illinois Sanitary Water Board
ISWS - Illinois State Water Survey
NRC - National Resources Committee
MCCC - Madison County Circuit Court Records
MCS - Madison County Sesquicentennial Committee
NYDEC - New York Department of Environmental Conservation
RCRA - Resource Conservation and Recovery Act
SCCCC - St. Clair County Circuit Court Records
SL&TC v. WSR - Shelbyville Loan and Trust Company vs. White Star Refinery
SIMAPC - Southwestern Illinois Metropolitan Area Planning Commission, Collinsville, Illlinois
USEPA - United States Environmental Protection Agency
USDA - United States Department of Agriculture
USDI - United States Department of the Interior
USGS - United State Geological Society
USHEW - United States Department of Health, Education, and Welfare
WRD&LD - Wood River Drainage and Levee District

Acknowledgments

This report bears the imprint of many individuals who deserve recognition for their contributions. The Circuit Court clerks and their staffs in Madison and St. Clair counties were tolerant of my searches for old documents and provided invaluable aid in tracking down certain court records. Archivists, librarians, and clerks at the levee districts, the local libraries, the Southern Illinois University-Edwardsville archives, the State Archives, the State Historical Library, the Southwestern Illinois Metropolitan Area Planning Commission, the Illinois Evironmental Protection Agency, the State Water Survey, and the State Library assisted in innumerable ways. Through their efforts and generous assistance, the material contained in this report became available.

The staff involved in collecting and analyzing the information presented here also merit appreciation. Claire Martin gathered congressional reports on the Corps of Engineers' activity in the vicinity of St. Louis. Kimberly Boone worked tirelessly to compile information on the evolution of the sewage treatment systems and the levee districts in the study area. Ellen Ferrara diligently collected geological and hydrological information, and began the process of data entry on the geographic information system. Ted Samsel, with assistance from Gerard Breen, joined the team and completed the immense chore of map construction and performed numerous research tasks. Tim Osburn worked meticulously to edit and revise the manuscript. Without their contributions, this project would not have been completed in a timely fashion.

I also must thank Al Wehrmann, Sue Schock, and Ed Mehnert of the State Scientific Surveys. They offered helpful comments and constructive criticism on progress reports and made their electronic data bases available to us. Both Wendy Garrison and Claudia Washburn of the Hazardous Waste Research and Information Center offered valuable guidance during the completion of this report. Also, Keri Luly of the IEPA provided insights into the history of waste management in the Sauget area.

Finally, I must offer thanks to the reviewers who lent their time and expertise to the chore of editing a draft manuscript. Dennis Campbell, Ellen Ferrara, Linnea Eschenlohr, Jeff Larson, Keri Luly, and David DeChenne all made useful comments; however, I accept responsibility for any inaccuracies or shortcomings.

The information in this document has been funded wholly or in part by the Hazardous Waste Research and Information Center of the Illinois Department of Energy and Natural Resources. It has been subject to the Center's peer review, and it has been approved for publication as an HWRIC document. Mention of trade names or commercial products does not constitute endorsement or recommendation.

Abstract

Madison and St. Clair counties contain large areas of land underlaid by sand and gravel aquifers, which are highly susceptible to contamination from land-buried hazardous materials. In addition, heavy industries were very active in the two-county area during the first third of this century. This combination of circumstances warranted an historical investigation to determine the possible extent of past hazardous waste-related activity that may continue to affect current residents of the area.

A thorough review of archival records provided sufficient information to reconstruct the past industrial geography of the two-county area, the history of waste management and public water supplies, and the sequence of surface alteration. Jointly, this collection of information permitted the mapping of zones of possible human exposure during much of the last 100 years.

Cartographic analysis of the map series suggests that there was little residential or commercial intrusion on former disposal grounds, but that contamination of public water supplies may have occurred in the past and may occur in the future.

Executive Summary

Madison and St. Clair counties emerged as major manufacturing centers during the 1890s and they experienced considerable industrial growth throughout the first third of the twentieth century. In recent decades, however, the manufacturing component of the economy has declined. The reduction in industrial activity has occurred during a period of increasing scrutiny of hazardous waste disposal activity, and major sources of hazardous materials may have closed before regulatory agencies began to keep systematic records on waste generation and disposal. Given a geologic and hydrologic situation that would allow land-disposed wastes to easily contaminate shallow sand and gravel aquifers, this two-county area was considered an ideal setting for an historical review of industrial waste management.

To gain insight into the hazardous waste history of the Madison and St. Clair industrial region, a reconstruction of two critical components of the region's past from 1890 to 1980 was attempted. The first of these was the industrial history. By tracing the development of manufacturing activity from its inception through its peak (ca. 1929), this study identified numerous sources of hazardous materials omitted from electronic files of hazardous waste generators. Furthermore, it provided a means to analyze the historical sources of wastes by comparing the geography of relict waste disposal sites with recent residential and public works developments.

Before 1930 the availability of inexpensive Illinois coal and ample water supplies attracted a complex of hazardous material sources to the American Bottoms, an alluvial floodplain stretching from Alton to beyond Sauget. Primary metal producers, coke and chemical plants, oil refineries, and metal finishing and fabricating firms dominated the inventory of hazardous material handling companies. They clustered in three zones on the flood plain of the Mississippi: Alton-Wood River, Granite City, and East St. Louis, and in the three upland communities.

The second component of the reconstruction was a review of waste management practices. During the first three decades of this century, there was virtually no treatment of industrial or municipal sewage. Untreated liquid wastes poured into streams, canals, and lakes throughout the two-county region, and solids accumulated in low areas. Numerous hazardous substances were included in the wastes released during this early period, but municipalities and state agencies targeted putrescible wastes as the primary public health concern. During and after the 1930s, state government and industry began to take greater notice of the effects of potentially harmful materials emitted by factories. They have jointly taken action to reduce the volume of liquid wastes, although this has resulted in the concentration of hazardous materials in sludges that have been buried in landfills.

By contrasting the record of waste generation and waste management with the land use and water consumption histories of the two-county area, this report offers an improved understanding of possible human exposure. Direct human exposure to past hazardous waste disposal is limited to several areas of encroachment of residential land uses on former dumps. Indirect exposure, in the form of consumption of contaminated water, was probably much more widespread in the past. Public water supplies fed polluted Mississippi River water into many homes in the region, although this hazard has diminished in recent years. Although the summary maps show that existing public water supply wells are not immediately threatened by documented hazard materials disposal sites, there has been extensive ground-water contamination in the Sauget area suggesting the documentary evidence is incomplete.

Based on the review of waste generation and management practices of the past, we make the following recommendations:

1. Full-scale ground-water monitoring should be implemented in Madison and St. Clair counties with all due haste, and monitoring wells should be situated to detect both recent and historical hazards.

2. Cooperative programs between the Hazardous Waste Research and Information Center and manufacturers should be initiated to document more thoroughly historical waste management practices and to reduce waste generation.

3. Landfills above the major ground-water pumpage areas should be monitored for possible saturation as ground-water levels rise and subsequent release of hazardous materials.

4. Methods for enhancing the historical utility of HWRIC-sponsored data bases should be considered.

CHAPTER 1 - INTRODUCTION

Madison and St. Clair Counties contain a once thriving manufacturing zone which stretches across the American Bottoms, an alluvial floodplain stretching from near Alton to beyond Sauget (Fig. 1.1). Although industry is still highly evident in the region, its dominant position in the economy has declined. Both economic and geographic situations were different in 1890 when several factors combined to promote development of the industrial complex there, and many of the same features of the area which attracted manufacturers contributed to the accumulation of hazardous materials in the environment. Inexpensive Illinois coal lured Missouri producers to the east side of the Mississippi River for economic reasons and also worked to attract industries historically associated with hazardous materials. Copious water supplies and an advantageous geographic situation provided an impetus for the construction of oil refineries, also sources of hazardous materials. Following the construction of extensive levee systems beginning in 1909, the undeveloped portions of the Mississippi River floodplain, with its open space for factory construction and waste disposal, became marketable property. In recent years, changes in the national economy have reduced industrial production throughout the region, yet the natural features of the area and its industrial past combined to create a situation deserving historical analysis of hazardous waste activity.

There are several programs designed to provide information about past and present hazardous waste disposal activity. Yet the earliest of these programs, the Resource Conservation and Recovery Act of 1976, is relatively recent and only touches the surface of historical industrial activity. The initial National Priorities List found nearly one quarter of the Superfund sites (those deserving immediate cleanup) active from before 1950, but the proportion of older sites has fallen in successive updates (Greenberg, 1984 and Colten, 1988). This is due largely to the methods used to compile the disposal site inventories. Both state and federal programs rely largely on self-reporting techniques, which cannot adequately include defunct businesses or even pre-1940 waste disposal activity conducted by extant companies. New York State was able to elicit only a 59 percent response rate when it surveyed industries on their waste-related activity over the past thirty years (NYDEC, 1985). The remaining 41 percent could have been responsible for significant accumulations of hazardous materials, to say nothing of the businesses which no longer exist and were not able to be queried. While some argue that most waste sites have been identified (Anderson, 1987), the uncontrolled and undocumented nature of pre-1950 waste disposal undermines this position.

This report will attempt to identify unknown sites and document past industrial waste disposal activity in the East St. Louis region (the two-county study area) by tracing industrial development forward through time, rather than moving from the present back into the past. By starting with the industrial complex of 1890, it will focus on the industries which were active during the peak manufacturing period and will not be hindered by recent factory closures. The report will add a review of public services such as sewage treatment and water supply as a means of delimiting corridors of possible waste movement and zones of possible public exposure. A reconstruction of landform modification in the vicinity of waste generators will also provide background on disposal activities during the past century. Such methodology should prove complementary to the existing databases (Schock, 1986 and Dixon and Hansel, 1985) and the ongoing environmental analysis in the area (St. John, 1981; Ecology and Environment, 1986; and Shafer, 1985).

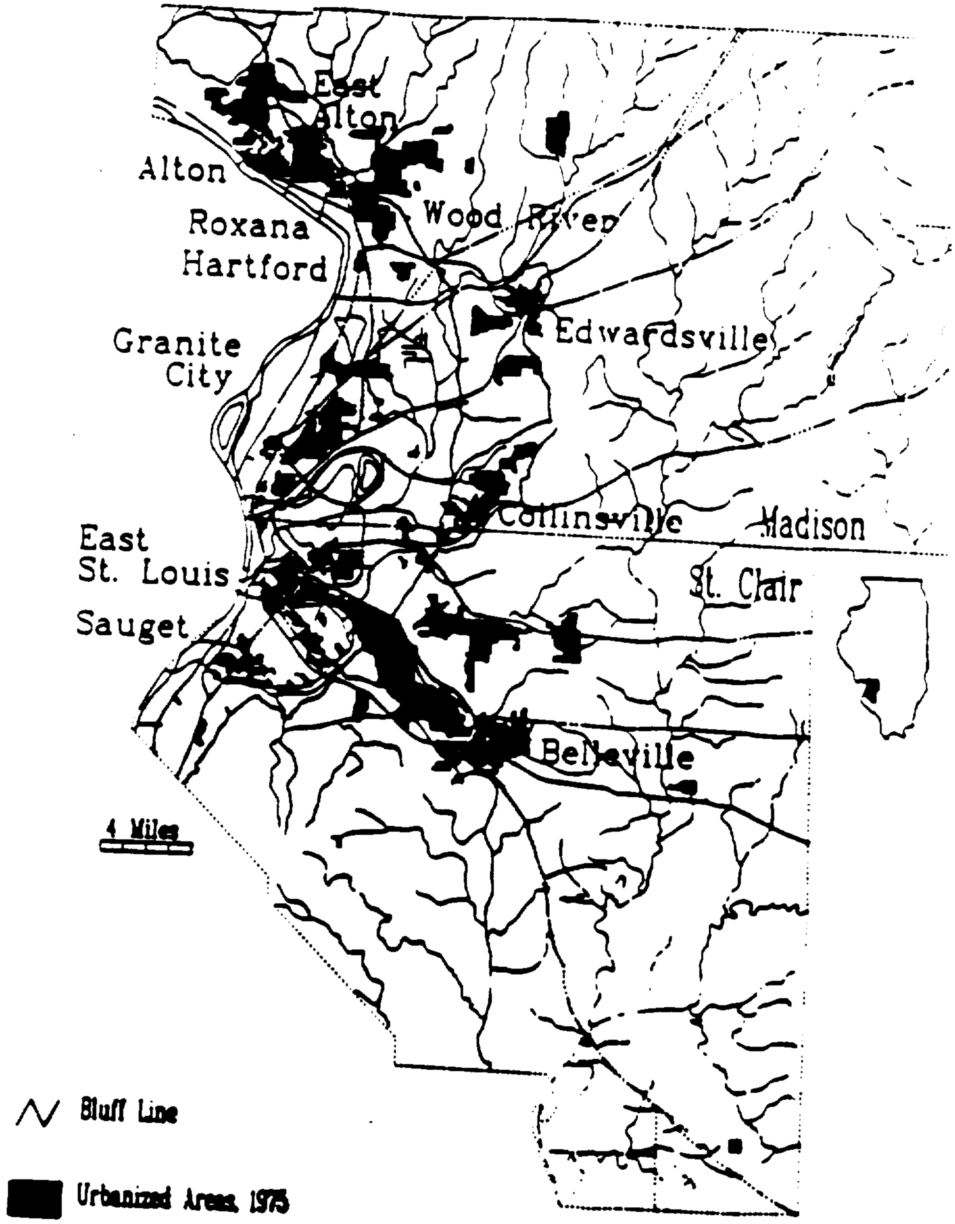

Figure 1.1. Madison and St. Clair Counties.

RENUM 041750

1.1 Historical Frameworks for Industrial Waste Disposal

The general perception that hazardous industrial wastes are a recent phenomenon is perpetuated by most writers on the subject (The term 'hazardous wastes' will be applied to such industrial wastes despite the relatively recent [1976] development of legal terminology which is more restrictive in its definition.). A typical example states that "[b]eginning with the end of World War II, a veritable technological revolution has taken place in the production of particularly hazardous materials, products, and processes" (Kates, 1977: 4). While the volume of synthetic organic chemicals has risen ten-fold since 1945 with a corresponding exponential growth in hazardous substances (Sarokin, et al., 1985: 16-19), hazardous wastes are not unique by-products of the post-war period. Numerous examples of late nineteenth-century manufacturing processes indicate that hazards have been left by the predecessors of today's chemical plants. Organic chemicals were produced widely during the 1920s as were petrochemical products and a host of other products associated with durable environmental contaminants (Colten, 1988; Tarr, 1985a, Coates, 1982). As the scale of industry grew, so too grew the volume of wastes generated by American manufacturers, and before 1930 there were virtually no controls on waste disposal (Tarr, 1985b).

Turn-of-the-century manufacturers and public works engineers had little concern with industrial effluent. They considered dilution an adequate form of treatment for most liquid wastes, and the Mississippi River could easily serve the growing set of factories in the St. Louis region (Tarr, 1985b). Developers and builders saw solid wastes as valuable materials for reclaiming low ground and tons of slag and other bulky wastes filled the sloughs and ponds of the American Bottoms. The growing chemical industry found marketable uses for some wastes during the 1920s, and a rising concern with water pollution prompted experimentation with waste treatment and by-product recovery during the 1930s. Nevertheless, treatment remained minimal and most industrial wastes were "improperly disposed of in open pits, surface impoundments, vacant land, farmlands, and water bodies." (Anderson, 1987: 182) Pollution-control regulations of the 1960s initiated widespread utilization of waste treatment facilities by both manufacturers and municipalities. The residue concentrated by treatment facilities, whether sludges produced from sewage or sediments collected by precipitators, required disposal, and as federal legislation targeted air and water pollution, it inadvertently shifted the environmental burden of disposal to land sinks (Tarr, 1984).

The geography of industrial activity added to the casual manner of waste disposal during the early years of this century. Seeking to escape municipal taxes, high land prices, and nuisance statutes, manufacturers located many plants in suburban sites between 1870 and 1920--this is precisely the case in the East St. Louis region. Clusters of industries serving as sources of produ s or consumers of by-products developed on relatively poor quality land (Colten, 1986). Beyon the city limits, municipal services such as sewage and water delivery seldom reached the suburban industrial complexes at the time of their development (Rosen, 1986). Consequently, they constructed their own water systems and developed internal methods for handling wastes. When urban services finally reached far-flung industrial districts, they were not needed or desired. Thus, there were often lags between the availability of sewage treatment and actual use of such services. This could, and did, cause continuing industrial waste accumulations in manufacturing districts after services became available.

This brief overview suggests the East St. Louis region had all the essential geographic characteristics for large quantities of industrial wastes to accumulate. The complex of industries generated hazardous wastes, the environmental conditions were precisely the type commonly usedfor waste disposal, and the political and geographic situation was conducive to uninhibited release of hazards. A retrospective analysis of these factors which were closely linked to hazardous material accumulation will provide essential detail of the history of industrial waste management in the East St. Louis region.

1.2 Reconstructing Past Waste Management Practices

The principal guide to selecting the Madison-St. Clair region was a recent report which delimited large areas of the American Bottoms as deserving high priority for ground-water monitoring (Shafer, 1985; see Fig. 1.2). The study analyzed both hydrologic and current hazardous material related activity to guide the design of ground-water monitoring systems. The high priority status of much of the American Bottoms suggested historical analysis could enhance the selection of ground-water monitoring sites.

Neither industrial activity nor waste disposal are spread evenly over the earth's surface. A quick scan of maps of manufacturing (see Fig. 1.3) and landfills (see Fig. 1.4) in the East St. Louis region makes this point evident. Factories are concentrated in several clusters along the Mississippi River and in the Belleville-Collinsville corridor on the uplands. Not surprisingly, landfill activity mirrors the distribution of population and manufacturing. Given the uneven pattern of activities associated with hazardous materials, a screening procedure was employed to concentrate on the area with the highest probability of such activities.

The first stage of the screening process was to identify areas of hazardous waste activity near the peak of industrial activity in the two-county region. Manufacturing employment grew dramatically between 1890 and 1929 (see Table 2.1, p. 14). For the two-county region, the number of wage employees increased from 5,904 to 39,450. While the number of workers continued to climb until about 1970, the number of establishments peaked in 1929, and most growth after 1930 was a product of internal expansion. Thus, geographically, 1929 is an appropriate date for delimiting the fullest extent of manufacturing activity.

A second step was to select the industries where hazardous materials might have accumulated. A review of occupational health literature provided general industrial categories where workers faced exposure to harmful substances during the early twentieth century (Table 1.1). Industries within the study area which fell into these categories were selected from the Illinois Manufacturers Association Directory (1929) and from fire insurance maps. Thus a map of approximate late-1920s industrial land use where hazardous materials were handled became the first product of the screening process. To account for off-site waste disposal and possible future expansion, a one-mile radius buffer was added around each industrial cluster. Together, the areas of known hazardous materials activity and the surrounding buffers delimit areas of probable accumulations of hazardous industrial wastes (Fig. 1.3).

The extensive wetlands of the American Bottoms presented challenges for early factory developers, but challenges with well-known contemporary solutions. Levee building, stream diversions, quarrying, strip mining, and land reclamation reshaped the topography of the floodplain. In doing so, engineers altered the natural drainage and created areas where water-borne sediments accumulated, as well as repositories for all manner of urban and industrial wastes. To identify areas of likely accumulation of wastes, whether deposited by natural processes or human agency, a surface alteration map was created (Fig. 1.4). It is a composite of natural

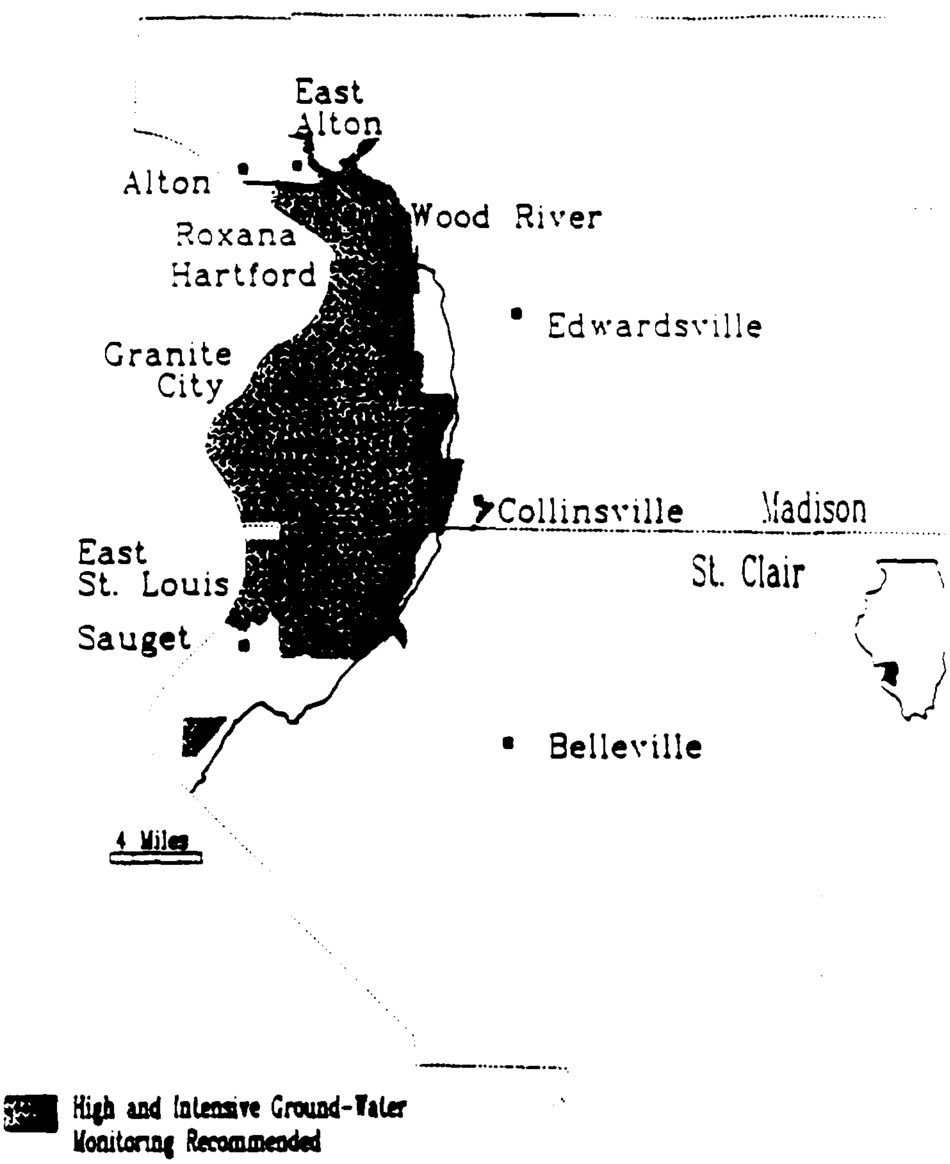

Figure 1.2. Combined Area of Intensive and High Monitoring Priority. Source: "Target Areas for Hazardous Substance Ground-water Monitoring in Sand and Gravel Aquifers," prepared by Wehrmann and Le Seur, in Shafer, 1985.

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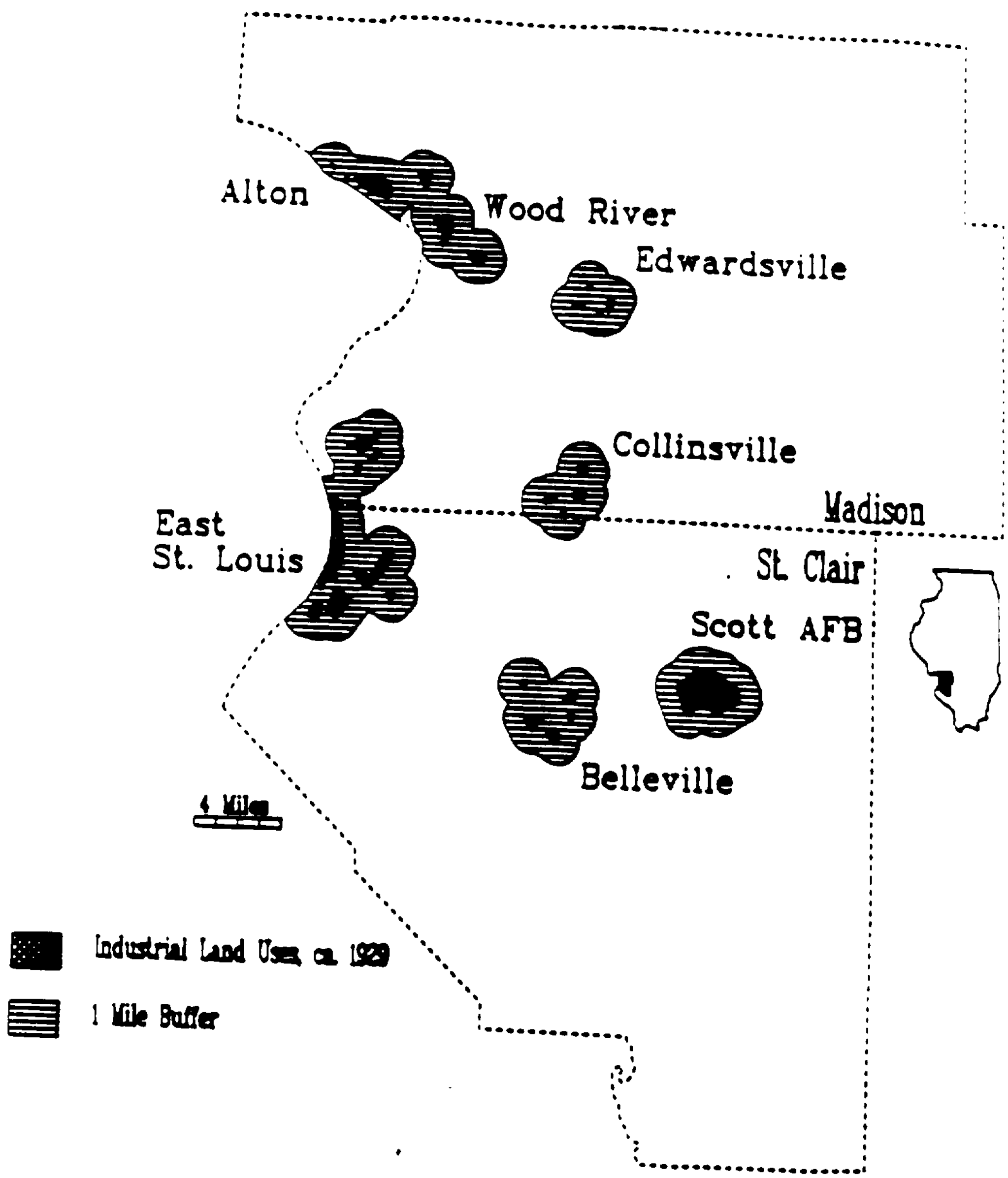

Figure 1.3. Industrial Land Use, ca. 1929 and One-Mile Buffer. Source: IMA, 1929.

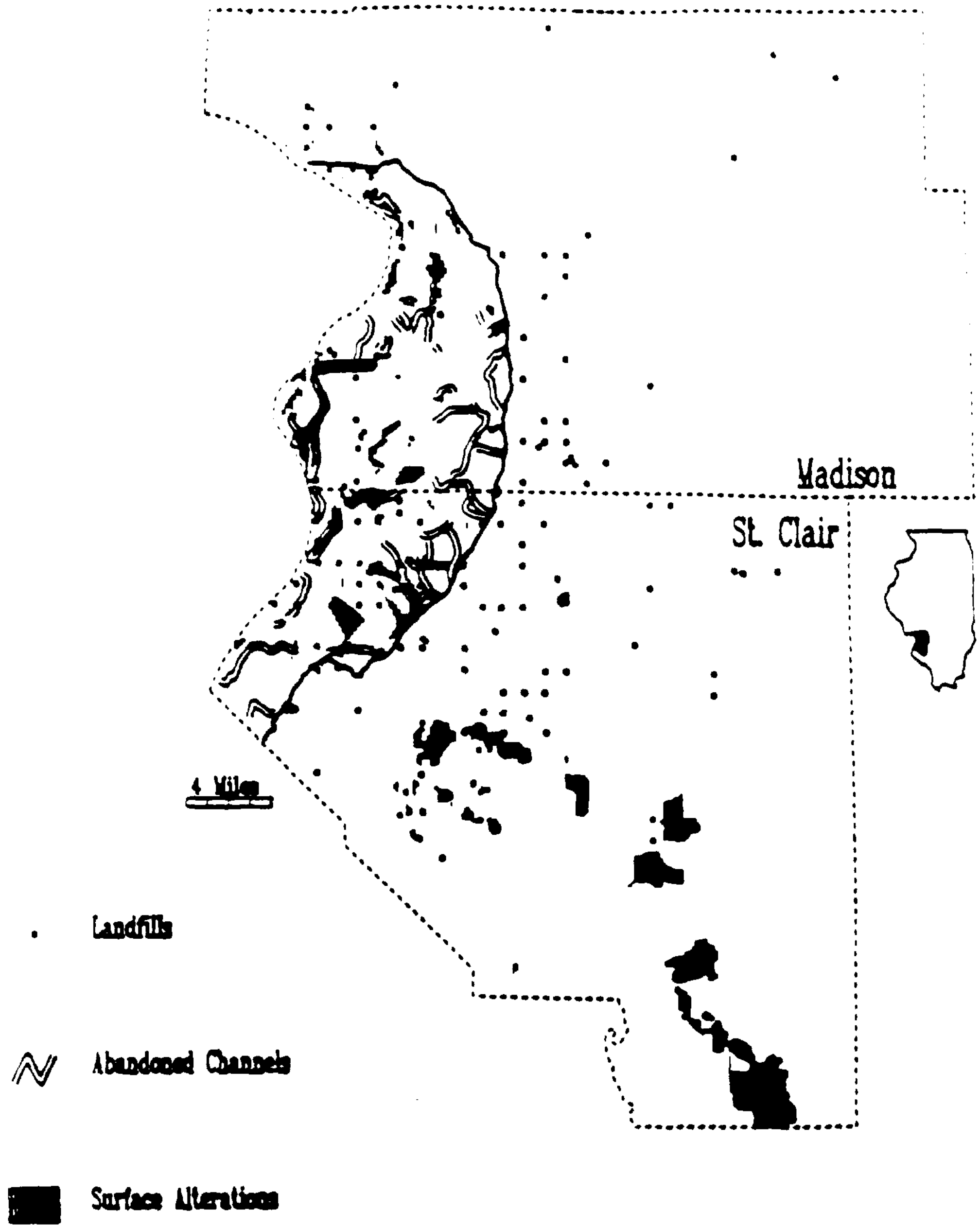

Figure 1.4. Surface Alteration History. Landfills appear to have a regular pattern due to incomplete legal location descriptions contained in the electronic database. Symbols are automatically placed in the center of the section in such situations. Sources: USDA, 1978, 1986; Illinois Abandoned Mined Land Reclamation Council, 1980; ISGS Landfill Inventory; USGS Topographic Maps; ESL&SD Records; and Wood River Drainage and Levee District Records.

Table 1.1. **Hazardous Materials-Handling Industries, 1929.**

Standard Industrial Classification	**Industry**
2491	Wood creosoting
2700	Printing
2800	Dry cleaning, ammunition, dyes, chemicals
2900	Petroleum and coal products
3100	Shoe manufacturing (tanning)
3200	Glass manufacture and clay products (excavations)
3400	Metal fabrication
3500	Machinery
3600	Electrical machinery

Sources: Coates, et al., 1982; Hamilton, 1925; McCord, 1931; and Oliver, 1902.

drainage systems, man-made drainage alterations, landfilling activity, and surface excavations. The final product depicts areas of historical sedimentation down-gradient from industrial areas, stream channels abandoned by flood-control projects, and major quarries and coal mines. Together, these three environmental categories represent areas typically used for industrial waste disposal, thus delimiting zones of possible accumulation of industrial wastes (Conzen, 1987: 367; Colten, 1985).

The combined areas of the two maps (Figs. 1.3 and 1.4) depict a zone of industrial activity associated with hazardous material and the type of surface modifications generally linked to industrial waste accumulation (Fig. 1.5). While not definitive of the distribution of hazardous waste sites, the summary map defined the area deserving more intensive scrutiny and it largely fell within the area designated as high-priority by Shafer (1985:cf. Fig. 1.2 and 1.5).

Following the screening of high-probability zones of hazardous materials, a more detailed study of three interrelated historical processes was carried out. The first process identified the generators of hazardous substances. All industries operating within the screened area were surveyed for possible hazardous materials used in their production cycle. This included a review of active and inactive manufacturers, analysis of processes used within the various plants, and a consideration of general waste streams associated with each particular class of industry. Trade literature, industrial directories, interviews, and archival records provided a partial inventory of sources of hazardous wastes.

A second factor in the history of hazardous materials accumulation is the manner of waste management. Although the specific record of waste disposal is fragmented and incomplete, it is possible to reconstruct a partial history. Through archival records and trade journals, the general nature of industrial waste disposal can be documented. Municipal and state records provide details on the construction and extension of public waste treatment systems, and court records provide some specific information on the release of hazardous substances. A reconstruction of past waste management practices, although incomplete, reveals a rough outline of what wastes were deposited in certain localities at known dates. From this sketch, an analysis of possible human exposure becomes feasible.

The third component of the in-depth survey is the set of processes which could cause public exposure to hazards. This section focuses on the development of public water supply systems and possible exposure through contaminated water. Also included are discussions of land use change which might have allowed residential encroachment on former industrial property and surface modification in public areas. This portion of the report is speculative and not to be considered a formal risk assessment. It consists of a series of overlay maps contrasting past hazardous material-related activity with the distributions of current populations and public services.

1.3 Objectives

The objectives of this project can be evaluated at several different levels. At the local level, a review of this type can identify unknown hazardous waste sites, or at least provide better documentation for known sites. By providing local public health officials with more complete historical information they will be better prepared to undertake risk assessments and proceed with clean-up activities. This review can provide useful information to other state agencies as well. It assesses the usefulness of various databases in historical analyses of past hazards, it provides a

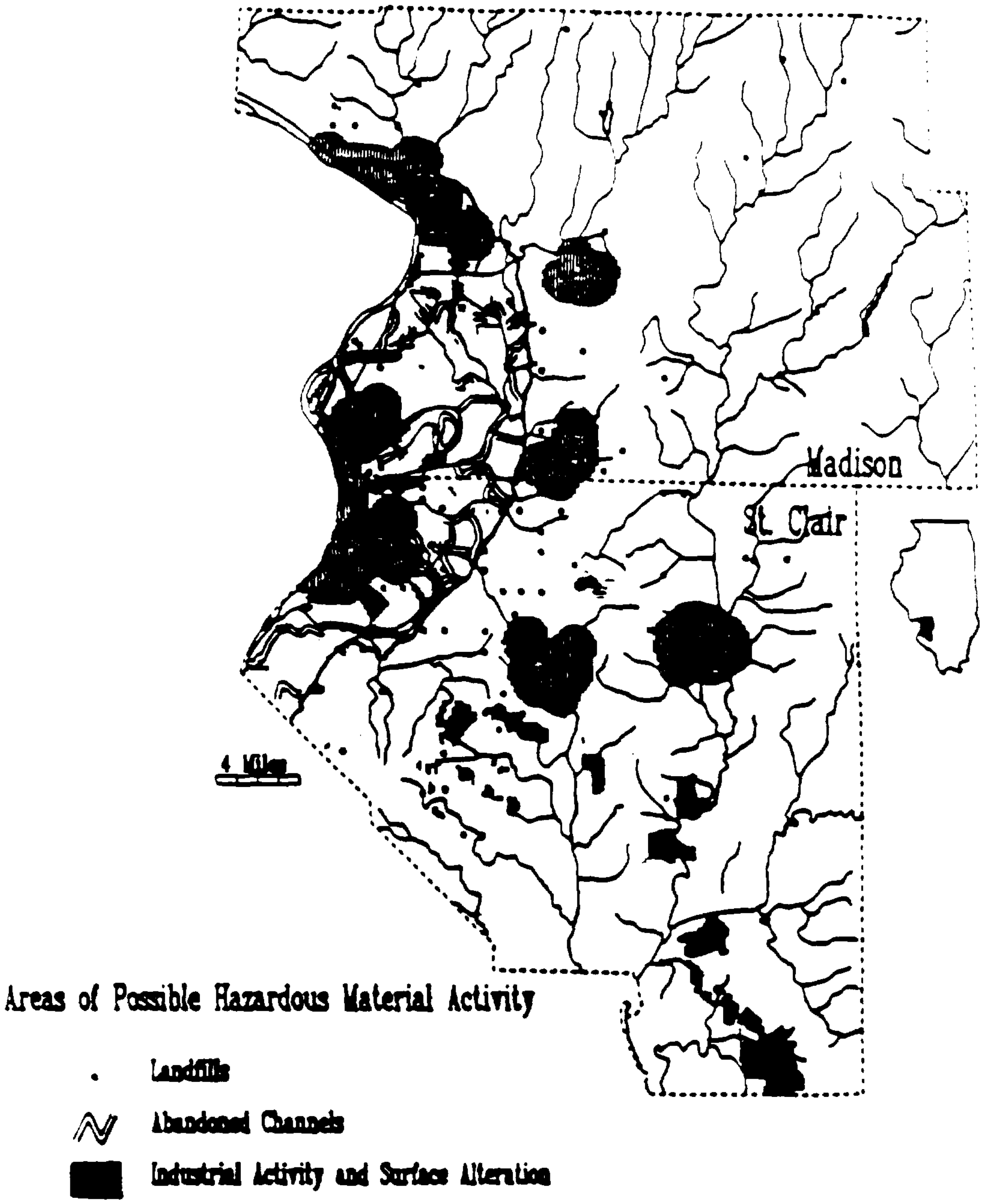

Figure 1.5. Area of Combined Hazardous Material Activity and Possible Accumulation of Hazardous Materials.

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geographic framework for ground-water monitoring, and it expands on our overall understanding of past waste disposal activities in Illinois. Finally, it provides additional empirical evidence to use in a chronology of past industrial waste management, the analysis of waste disposal in urban development during the past century, and an assessment of the overall significance of pre-1950 industrial wastes. At all levels, this project has practical utility and yields useful information.

CHAPTER 2 - INDUSTRIAL WASTE SOURCES, 1890-1980

The existence of hazardous wastes in the environment is contingent on two basic human activities. The first, and perhaps most important, is the operation of manufacturing activities which create wastes. A second related activity is the transfer of wastes from factory sites to disposal grounds. There are of course other means of depositing hazardous substances in the environment such as the release of agricultural chemicals and even dumping of hazardous household products. Nevertheless, for the purposes of this study it is wholly appropriate to focus on industrial activity as the major source of persistent hazardous substances. During the first half of this century, industry produced and disposed a large proportion of all hazardous materials in Madison and St. Clair counties. Furthermore, prior to the passage of legislation which regulated waste disposal, manufacturers were free to discard wastes in a casual manner, and to avoid incurring high costs they seldom transported the wastes great distances. Hence, the areas where industries worked with hazardous substances became the primary repositories of hazardous materials.

This section will look at the chronology of industrial development in Madison and St. Clair counties as a means of assessing the generation of hazardous wastes. It will also consider the evolving geographical pattern of manufacturing activity to identify areas of past hazardous substance-related activity. Industries which handled all manner of hazardous materials will be considered possible sources of hazardous releases. Incomplete documentation of past disposal practices and known associations between accumulations of hazardous materials and factories which handled those substances require that such a broad definition of hazardous waste generators be used (Colten, 1988).

2.1 Early Industrial Development, 1890-1929

Before 1890 there had been limited industrial activity on the east side of the Mississippi River across from St. Louis. Railroads focused on the population and manufacturing center of the region. Nevertheless, the absence of bridges--forcing trains to break for the ferry trip across the river--fostered some manufacturing activity in selected east-bank districts. Alton, an early rival to St. Louis' regional dominance, built an industrial base on its limestone quarry, and the Illinois Glass Company started operations in 1873. East St. Louis became the railhead for east-bound freight and attracted meat-packing plants which opened in 1874. In addition, flour mills serving the Illinois agricultural hinterland became established along the waterfront in East St. Louis. A third concentration of industries developed in the Belleville area and consisted of metal-working concerns and breweries. These three incipient cores of manufacturing, along with extensive coal mining, provided a foundation for future development and strongly influenced the composition of subsequent industrial complexes (Harper, 1965: 72-77).

Between 1890 and 1919 the scale of manufacturing on the east side grew dramatically, and the number of factory wage earners in Madison and St. Clair counties increased 122 percent. Although the rate of increase slowed somewhat during the next decade, the overall gains in terms of total employment were significant. The number of wage earners rose from 1,686 in 1890 to 22,089 in 1929, and St. Clair's count of factory jobs rose from 4,218 to 17,361 during the same period (Table 2.1). Manufacturing employment rose from 3.3 and 6.3 percent of the total population in Madison and St. Clair counties in 1890 to 15.4 and 11 percent respectively by 1929.

The expansion of industrial activity in the East St. Louis region reflected national growth in the manufacturing sector both in the types of factories involved and their scale of operation. Mergers, consolidations, and vertical integration vastly increased the scale of industrial operations and centralized control (Chandler, 1977). In Madison and St. Clair counties, this is indicated by the inverse relationship between the number of jobs and the number of manufacturing establishments. The total number of manufacturing establishments fell from 234 in 1890 to 198 in 1929 in Madison County and from 353 to 282 in St. Clair (Table 2.1). Thus, the average number of employees per operation rose from seven to 112 in Madison and from twelve to sixty-two in St. Clair. The marked difference between the two counties indicates a persistence of small-scale, craftsman-type manufacturing in St. Clair--particularly in the Belleville area--while several large-scale factories opened after 1890 in Madison County. In fact, over half of the large-scale plants operating in 1965 had their origin between 1890 and 1920 (Harper, 1965: 82).

Numerous local factors combined to encourage selection of east-side sites for industrial construction. A limited number of conveniently located tracts of land in St. Louis prompted entrepreneurs to look for property on the Illinois side of the river (Taylor, 1915: 129-30). With the completion of bridges across the river, starting with the Eads in 1875, St. Clair and Madison counties' waterfront and railside properties took on new attractiveness with its level topography and the availability of large contiguous parcels of land (Thomas, 1927: 84-5). The one obvious disadvantage, periodic inundation, was addressed after the 1903 flood, when regional drainage districts organized to construct levees and diversion channels. Legal differences also contributed to the selection of east-side sites. The absence of smoke abatement legislation in Illinois and also the tolerance of longer work days and weeks in Illinois were additional attractions (Taylor, 1915: 130-2). A natural advantage of the Bottoms was the nearly unlimited supply of water. Both surface water and rich supplies found in shallow sand and gravel aquifers were easily accessible for industries requiring large quantities of process water.

Perhaps the most notable lure of the east side was the existence of cheap fuel for use in factories. Soft Illinois coal existed in abundant supplies near the surface in St. Clair County and in shallow strata beneath Madison County. Extraction of these deposits began in the mid-nineteenth century, although significant economic advantages for east side consumption of that coal arose later. In 1915 the Terminal Railroad Association charged only thirty-two cents to deliver a ton of coal to any east-side location while charging fifty-two cents per ton for delivery in St. Louis (Taylor, 1915: 130). Opposition to this policy resulted in a hearing before the Interstate Commerce Commission, which ruled that the differential rate was justified (Thomas, 1927: 84-5). Thus, industries which consumed large quantities of coal such as steel mills, smelters, and power plants found economic advantages in selecting sites on the east side.

The coal advantage strongly influenced the basic set of industries on the east side, which in turn affected the makeup of associated industries. Generally, industrial districts expand as producers of affiliated products cluster near a source of semi-processed materials or as primary processors relocate to reduce transportation costs of their product to a secondary processor (Pred, 1964). In the East St. Louis area, steel mills attracted metal-fabrication plants, metal-plating firms, and, as the scale of steel-making operations increased, blast furnaces to supply pig iron. Coke works came in conjunction with primary-metal operations as did by-product industries, such

Table 2.1. **Manufacturing Establishments and Employment in Madison and St. Clair Counties.**

Year	Madison		St. Clair	
	Number of Establishments	Employees	Number of Establishments	Employees
1890	234	1,686	353	4,218
1929	198	22,089	282	17,361
1949	182	34,637	252	23,158
1953	202	38,506	261	26,098
1959	207	33,803	242	19,719
1964	184	35,237	245	15,555
1969	199	35,415	227	17,257
1974	194	31,373	180	11,437
1979	188	30,097	174	10,478

Sources: U.S. Census, Census of Manufacturers, 1890 and 1930; U.S. Department of Commerce, County Business Patterns, 1949, 1953, 1959, 1964, 1969, 1974, 1979.

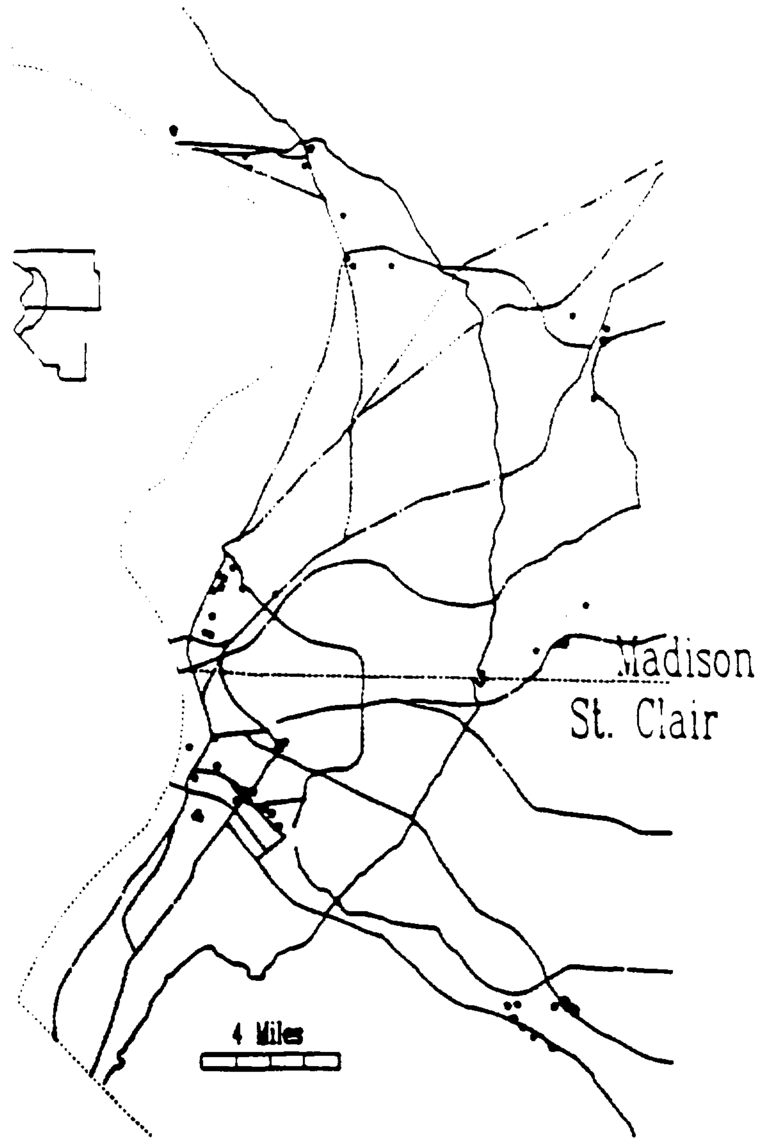
as creosoting operations, roofing materials, explosives and chemical plants. Another source of by-products was the packing industry which supplied a source of materials for fertilizer producers and hides for tanning and shoemaking. Acid works were another type of operation with linkages to the steel and metal-working plants, and they established a foundation for other chemical manufacture. Oil refiners chose the American Bottoms largely because of copious water supplies, available property, and proximity to major Midwestern markets--the coal advantage and linkages to coal-dependent industries were negligible in their decisions (Harper, 1965).

Based on a review of pre-1940 Superfund sites and the occupational health literature for the pre-1930 period, the presence of hazardous materials was widespread among the type of industries that developed in Madison and St. Clair counties (USEPA, 1984; Coates, 1982; McCord, 1931; Hamilton, 1925; and Oliver, 1902). Lead and zinc smelters were acknowledged as sources of toxic metals which posed health threats to workers and also damaged surrounding vegetation (Illinois Commission on Occupational Diseases, 1911). Accumulations of metals are also associated with foundries, and there were several in the two-county region. Steel mills typically generated a variety of wastes including acids, phenols, cyanides, and oily liquids. Coal and coal by-products operations also handled a variety of hazardous substances, although some materials were destined for use in a final factory product. Nevertheless, the presence of hazardous materials on site commonly led to accumulations. Local gas works, found in several of the communities, chronically left tars on site and also generated phenolic wastes. Coke works produced similar wastes in larger quantities, although the development of roofing products and munitions plants created a market for tars and toluene. The accumulations of organics at such operations is a possibility, and pentachlorophenols (PCPs) have been found at many creosote operations throughout the country. Chromium wastes were hazards at leather tanning operations after the 1920s, and arsenic and cadmium were hazards associated with glass works. Finally, the petroleum refineries of the early twentieth century issued oils, acids, metals, and phenolic wastes. Thus, the complex of industries found in the Madison-St. Clair study area included many of the major sources of pre-1930 hazardous materials and wastes.

A total of 116 industries in the two-county region typically handled hazardous materials in 1928 (Fig. 2.1) (Illinois Manufacturers Association, 1929). This tally included all industries in the categories listed in Table 1.1. This rather high total points out a possible historical deficiency in the HWRIC database of potentially contaminated sites (Schock, et al., 1986). A review of the sites included in the HWRIC inventory indicates that a total of only twenty-seven sites were active before 1930, yet few of these were major hazardous-material producers at that time. Whether the discrepancy results from businesses changing their names, from the inherent difficulty of determining the starting date of manufacturing operations, or from a broader definition of hazardous substance-handling industries is difficult to determine. Nevertheless, it suggests that the older sites may be under-represented in the database. The total found in the IMA directory indicates the handling of hazardous materials was widespread before 1930.

2.2 Recent Industrial Activity, 1930-1980

The economic uncertainties of the Depression years interrupted the rapid growth of industry in the two-county region and forced some of the smaller firms to close. By the end of the 1930s, manufacturing in Madison and St. Clair counties was characterized by a few large manufacturing operations (Harper, 1965: 89). Entry into the Second World War encouraged company owners to expand and modernize their plants. Critical industries such as petroleum refining, munitions, and



• Hazardous Material Handling Industries, ca. 1929

Figure 2.1. Hazardous Material Handling Industries, ca. 1929. Addresses of some of the industries listed in the IMA Directory were not available and these have been omitted. Source: IMA, 1929.

steel making expanded during the war and increased their number of employees. Shortly after the end of World War II, manufacturers employed nearly 20,000 more workers than in 1929. Both Madison and St. Clair counties experienced employment peaks about 1953 when 64,604 workers were engaged in manufacturing jobs (Table 2.1). There was a decline in both the number of workers and industrial establishments during the late 1950s and early 1960s. This resulted in the elimination of many companies, some of which handled hazardous materials (Harper, 1965: 90).

Since each derelict industry is a potential site of waste accumulation, an attempt was made to estimate the number of industrial closures involving hazardous materials handling operations. A review of the HWRIC database (Table 2.2) indicated that there were 111 businesses which closed during the 1950s and 1960s (8.2 percent of the total listings). Statistics compiled by the County Business Patterns supports the HWRIC data. For all industries (not just those handling hazardous materials), the number of establishments in Madison County declined 1.5 percent between 1953 (the post-war peak) and 1969 (Table 2.1). St. Clair County registered a decline of 13 percent for the same period. When only those Standard Industrial Codes associated with hazardous materials were tallied, they showed the number of St. Clair industries declined 22 percent while Madison's total fell only 1.1 percent. While not well-matched sources of comparative information, the relatively similar number of closures for St. Clair supports the utility of the HWRIC database—although the Madison County results provide a warning that this data set needs to be cross-checked when used as a historical reference.

Although the trends of the early 1960s were reversed briefly in the early 1970s, there has been a steady decline in the number of industrial jobs in the two-county region since 1974. Madison County held on to 30,000 positions in 1979 while St. Clair had dropped to 10,000 (Table 2.1). One factor viewed as a deterrent to renewed development was the passage of pollution control legislation during the late 1960s and early 1970s (Thornton and Koepke, 1981: 326). A review of the HWRIC database indicates that sixty-three hazardous material handling industries in St. Clair County (10.4 percent of the total companies operating in that decade) ceased to operate while only thirty-eight, or 5.9 percent, ceased operations in Madison (Table 2.2). The net effect of the manufacturing decline has been to idle several factories and reduce the number of hazardous material sources.

2.3 Industrial Waste Generation

Previous reports attempted to calculate gross estimates of the volumes of industrial waste production based on employment (Colten, 1988; Colten and Breen, 1986; and Colten, 1985). Multipliers developed for the State of Illinois were applied to tallies of the number of employees in major industrial categories (Weston, 1974). This strategy provided unsuccessful results for the current investigation due to the inconsistent quality of the historical record. Illinois Manufacturers Association directories included sporadic counts of the number of employees in specific plants. The two other major sources of such information, the U.S. Census of Manufacturers and the County Business Patterns, fail to provide systematic information. The census summary reports do not offer consistent geographic or job category listings, while the County Business Patterns provide ranges of employment rather than precise counts. This is particularly true for the major sources of hazardous wastes. Hence, no satisfactory estimates can be offered.

Table 2.2. Industrial Closures, 1930-1970.

Decade	Madison		St. Clair		Two County Total	
	Number	% of Decennial Total	Number	% of Decennial Total	Number	% of Decennial Total
1950s	13	7.5	6	2.7	19	4.8
1960s	39	10.4	53	12.2	92	11.3
1970s	38	5.9	63	10.4	101	7.5

Source: Illinois State Water Survey. Hazardous Waste Research and Information Center Database, 1987.

There were obvious concentrations of industries associated with hazardous materials before 1930 and these remained important nodes of hazardous waste generation throughout the next fifty years. More than 96 percent (112 of 116) of all industries linked to hazardous materials in 1928 were located in Alton, Wood River, Granite City, East St. Louis (including adjacent manufacturing towns), or Belleville.

2.4 Industrial Districts

The clustering of hazardous material handling industries provides a framework for closer scrutiny of the several areas of concentrated activity. This section will review the historical development of four manufacturing districts. The first three are distinct clusters found on the American Bottoms--Alton-Wood River, the Tri-cities area, and the East St. Louis manufacturing complex. The fourth area is more dispersed and includes the upland industrial communities of Belleville, Collinsville, and Edwardsville.

2.4.1 Alton-Wood River

The Alton-Wood River industrial complex developed on a triangular parcel of floodplain immediately downriver from Alton (Fig. 2.2). One exception to this locational generalization was the Alton Gas Works which began operation in 1855 on Belle Street. By 1877 it was distributing gas throughout Alton, although it shifted to electrical generation in 1885 (Federal Writers Project, 1936). Nevertheless, it continued the manufacture of local gas through 1915. Its facilities have long since been removed from the landscape, and the Alton Post Office now occupies its former site.

In 1873 the forerunner to Owens-Illinois Glass Company began operations. After two years of growth, the company, with the help of the city, acquired a parcel of reclaimed land where Shields Creek emptied into the Mississippi River and established its new base of operations. By 1887 there were five furnaces in operation and as many as 900 workers turning out glass bottles. The company added automated bottle-making machinery in 1911 and gradually phased out the hand-blown operations. In 1929 Illinois Glass merged with Owens Bottle Company to become Owens-Illinois (Owens-Illinois, n.d.). The company employed about 4,000 workers by that time (FWP, 1936). Although modernization of the operations allowed the total number of employees to fall to around 2,000 by 1969, the glass works remained a major employer in the Alton area. Historically, arsenic and cadmium have been associated with glass productions and both the Godfrey and Alton plants generated RCRA-regulated wastes in recent years (IEPA, 1985). Currently, the Alton plant is closed and undergoing demolition.

Other early twentieth-century industries characterize the range of hazardous waste generators. Laclede Steel began operation as a rail re-rolling operation in 1911 and expanded alongside the glass works. By the 1960s it employed 4,000 workers and specialized in reinforcement bars and tubing. In 1984 it produced over 775 tons of RCRA wastes (IEPA, 1985). Another industry which began in the the 1910s was the American Pigment and Chemical Company. Although it failed during the Great Depression, it struggled through several corporate incarnations for more than two decades, during which time it produced a variety of barium paint pigments and a barium carbonate rat poison (Alton Evening Telegraph, 1910-32). The company operated east of Alton

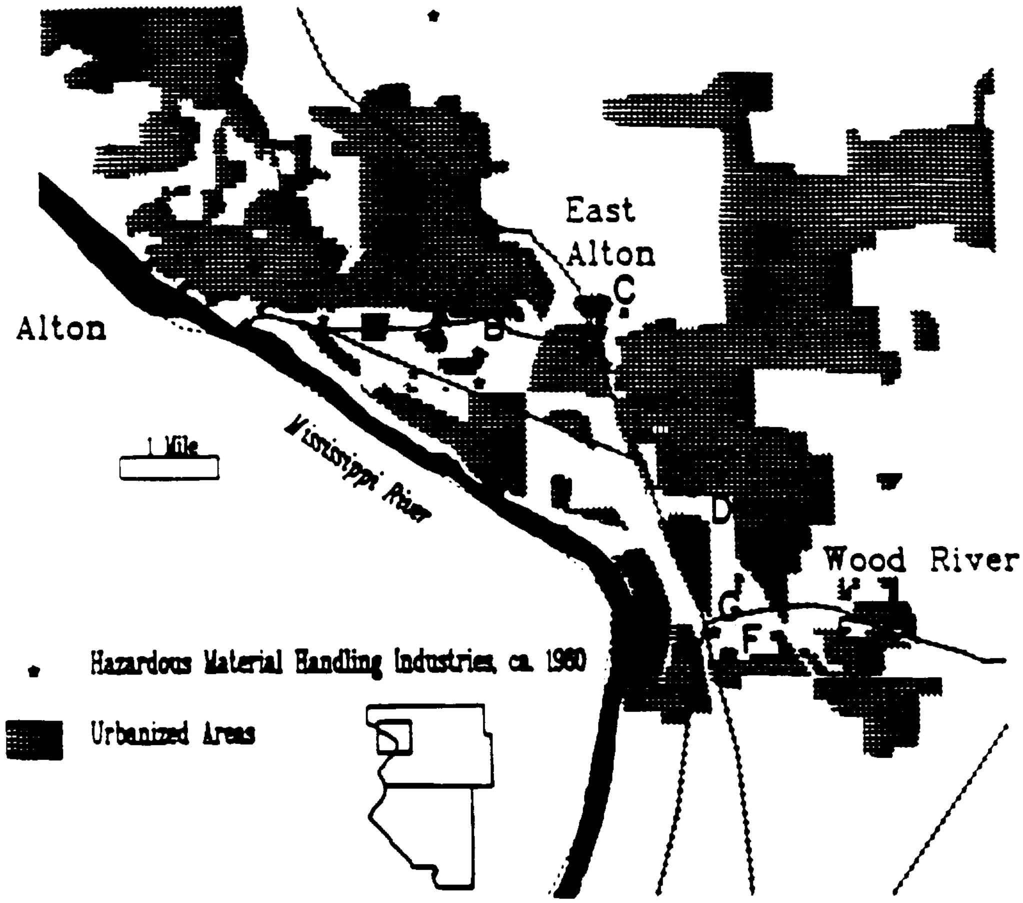


Figure 2.2. Hazardous Material Handling Industries in the Alton-Wood River District, ca. 1960. A. Owens-Illinois Glass Co., B. Laclede Steel Co., C. Olin Mathieson Chemical Corp., D. Standard Oil, E. Shell Oil Company, F. The Clark Oil Co., G. International Shoe Co. Source: IMA, 1960.

on the floodplain. A final contemporary of the steel and pigment companies was the Alton Box Board Company. Starting operation in 1911, the box board company manufactured cardboard containers and putrescible, sulfite-laden wastes (Alton City Plan Commission, 1928, and Howe and Van Antwerpen, 1939). Although seen as the chief source of water pollution in the Alton area during the first half of this century, it has not been a major source of hazardous wastes.

The East Alton munitions industry provided a second nucleus of hazardous material-related activity. Begun as a powder mill in 1892, the Olin-Mathieson Chemical Corporation (formerly Equitable and Western Cartridge) grew as coal mines demanded powder to open shafts and it expanded further during World War I. Federal Lead built a lead smelting plant to serve the munitions plant in 1901 and Olin added a brass works in 1916 (FWP, 1936, and Madison County Sesquicentennial, 1962). Both metals and organic chemicals are hazards associated with such operations, and in 1984 Olin produced over 200 tons of RCRA wastes (IEPA, 1985).

The petroleum refining complex near Wood River is the third concentration of hazardous materials-related industry in the Alton area. Standard Oil (Amoco), the first of the major refiners, opened operations in 1908 when it began refining crude oil into gasoline, kerosene, lubricants, and other by-products. Initial capacity was 7,500 barrels a day. In 1913 the company installed Burton-Humphreys cracking stills and later replaced them with improved tube stills (Amoco Oil Co., n.d.). Each phase of process improvement increased production and by the late 1960s the Wood River refinery could refine 73,000 barrels daily. Before the plant closed, it was generating 450 tons of RCRA wastes in 1984 (IEPA, 1985).

Two neighboring refineries are the Shell Oil Company (originally Roxana Oil Company) and Clark Oil (formerly Wood River and Sinclair). Shell constructed its main Midwestern refining operation on the American Bottoms in 1917-18 and during its first year of operation produced sixty-six million gallons of fuel oil, eleven million gallons of gasoline, and thirteen million gallons of kerosene distillate (Beaton, 1957: 146-7). The company added several Trumble Units during the next decade and boosted capacity to 45,000 barrels a day. The Wood River plant was the site of extensive experimentation with solvent extraction during the 1930s and later became a major source of lubricants for Shell. The capacity continued to increase, and by the late 1960s, the plant had the capacity to handle 200,000 barrels per day (Shell Oil Co., 1968). Clark Oil's refinery began operation in 1941 as the Wood River Refinery. It later became part of the Sinclair Oil Corporation in 1950 and Clark purchased the operation in 1967. At that time, the capacity of the Hartford refinery was 31,000 barrels per day. Since the Clark acquisition, the total capacity of the plant has more than doubled. Components of the refinery include a Catalytic Cracking Unit, an Alkylation Unit, and a Coking Unit (Clark Oil Company, n.d.). Together the two plants are capable of generating in excess of 900 tons of RCRA wastes annually (IEPA, 1985).

A third refinery in the vicinity of Wood River was the White Star Refining Company. The short-lived venture began operation in 1919 and was forced to close in the mid-1930s. Shell Oil purchased the site and now operates its sulphur plant there.

A final source of hazardous materials was the International Shoe Company which operated a tanning plant in Hartford from 1917 until 1964. Chromium wastes and tannic acids are typically associated with fine leather tanneries and were found in water samples taken near the plant in the 1920s (Illinois State Archives, 1932).

2.4.2 The Tri-Cities Area

The Tri-cities area includes Granite City, the major population and manufacturing center of the complex, and two smaller communities, Madison and Venice (Fig. 2.3). This aggregation of industry typifies the establishment of company towns on the east bank of the Mississippi and it shares some of the problems created by the politically fragmented urbanized areas.

In 1892 the Niederinghaus brothers, owners of the St. Louis Stamping Company, decided to expand their family operation, and to do so, they searched for suitable property on the American Bottoms. They purchased land near where the Chicago and Alton and the Chicago and Peoria railroads merged. The site was slightly higher than the surrounding floodplain and also was situated near the soon-to-be-completed Merchants Bridge. The family commissioned a city plan and by 1894 workmen began laying out Granite City. Construction on the core industries, Markel Lead (now Taracorp), American Steel Foundry, St. Louis Stamping Works, and the Granite City Steel Works, commenced simultaneously. Factories began operation in 1895 and the newly-created job opportunities attracted workers from Missouri. Population grew rapidly, from zero in 1890 to over 9,000 in 1910, with 5,600 factory jobs in 1914 (Beutteamuller, 1953-4: 151-5).

The dominance of the Niederinghaus family over all phases of city development, along with a higher risk of flooding in neighboring Madison and Venice, resulted in a concentration of industry in Granite City. The nearby towns grew largely as dormitory communities for workers in the Granite City mills, and by 1910 they housed some 8,700 residents. Venice was described as a settlement of 'ramshackle houses' and 'shanties on scows' (Taylor, 1915: 135). Madison, which predated Granite City, remained a separate entity although it was contiguous with the plan of the larger company town. Such political distinctions allowed nuisance-causing industries to operate in proximity to population centers without being subject to legal action from the communities they affected.

The sequence of factory openings chronicles the beginning of hazardous waste generation in the Granite City area. The first operation to go into production was the Niederinghaus' St. Louis Stamping Company (later NESCO) which manufactured enameled and galvanized tin ware. An open hearth steel mill opened soon afterward and it primarily produced steel plate goods. This plant, the Granite City Steel Company, added pickling, annealing, and cold rolling departments in 1900, along with gas producers for the open hearth ovens (Beutteamuller, 1953-54: 199-202). Thus, by the turn of the century the Niederinghaus interests were producing a full range of hazardous wastes associated with steel mills.

Other sources of hazardous materials joined the steel mills by 1924. Two lead smelters arrived by 1910--National Lead (formerly United and Markle) and Hoyt Metal. St. Louis Coke and Iron (subsequently Granite City Steel Blast Furnace Division) initiated operations in 1921 and supplied not only the metal-working operations with pig iron, but also provided raw materials for coke by-product consumers. The F.J. Lewis Company (later Reilly Tar) produced coal-tar products, and Midland Creosote (later Jennison-Wright) used these in their wood-preserving operation (Austin, 1977). Such operations are typically linked to accumulations of phenols, PCPs, and coal tars (USEPA, 1985) and all have been operating more or less continuously since the early 1920s.

In neighboring Madison, Barber Asphalt and the Kettle River Treating Company had operations which consumed coke by-products and possibly left hazardous materials on site.

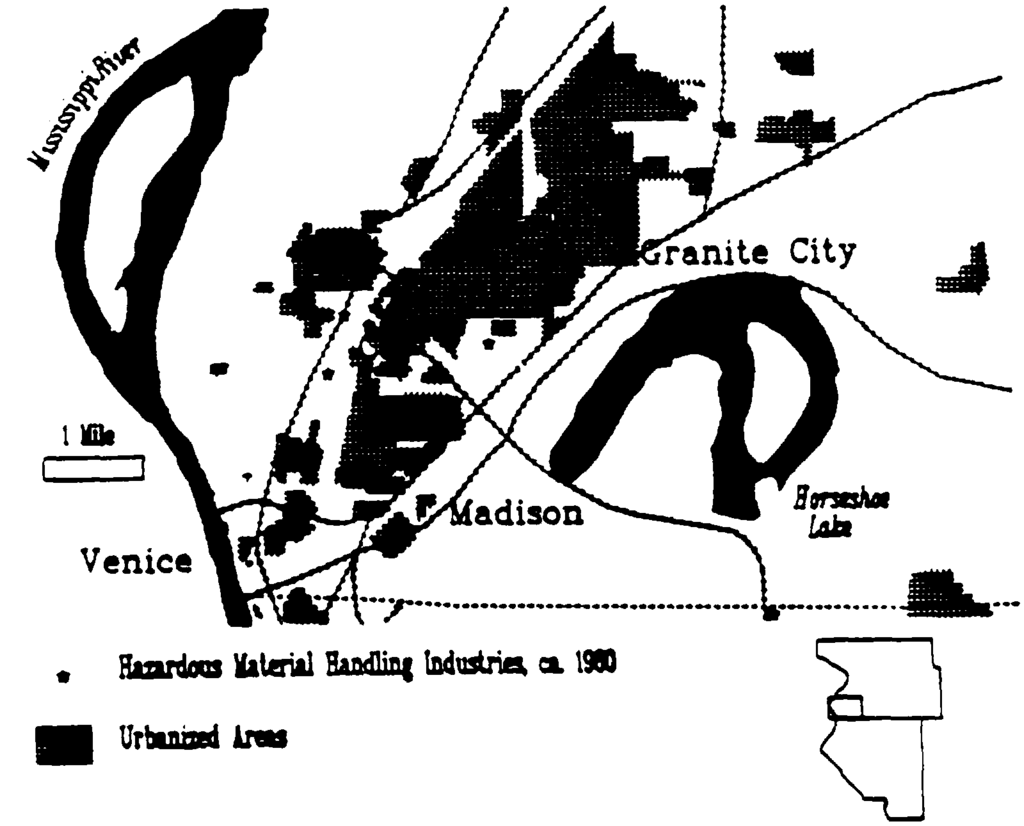


Figure 2.3. Hazardous Material Handling Industries in the Granite City Area, ca. 1960. A. Nesco, B. Granite City Steel Co., C. National Lead Co. Source: IMA, 1960.

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During the years following 1930, Granite City industry was characterized by continued growth within existing plants, although the city attracted few new companies. The city remained dependent on local industry and particularly those established by the mid-1920s. Metal-working establishments continued to dominate the employment picture in the Tri-cities area through the 1960s. New additions to the older complex included several metal plating companies (Diamond and Finley), an aluminum processing operation (Dow and later Consolidated Aluminum), and an instant coffee manufacturer (Nestle).

2.4.3 The East St. Louis Area

The third industrial complex on the American Bottoms developed around the city of East St. Louis (Fig. 2.4). Originally the main transfer point for ferry traffic across the Mississippi River into St. Louis, East St. Louis developed as a rail hub, served as the residential center for neighboring manufacturing clusters, and eventually lost many of its important industries.

No other manufacturing complex in the Madison-St. Clair County area exemplified the fragmented political structure of corporate satellite cities as did the East St. Louis district. In 1859 the village of East St. Louis was incorporated, and in 1861 it merged with an adjacent community, Illinoistown. The newly-created entity provided services commonly associated with riverfront towns--freight handling and storage; room, board, and entertainment for travelers; and transportation services (IDOT, 1982; Bond, 1962; and Korsok, 1959). The railroads, which arrived during the 1840s and 1850s, had strengthened the position of East St. Louis as a focus for west-bound commerce, and in 1871 local businessmen began to develop a central livestock trading facility north of the city. They incorporated National City, a distinct political entity from East St. Louis, to house the stock yards, a traders' hotel, and several packing plants by 1900, yet had only a handful of residents. Thus, it was the first of the nearly exclusive industrial towns. It was followed by Fairmont City in 1914, Monsanto (currently Sauget) in 1926, and Alorton in 1944. Each of these corporate towns housed a major manufacturing concern, and was largely controlled by the central employer. East St. Louis housed a few manufacturing concerns along the rail lines, but its main function was that of a dormitory community for the factory towns surrounding it (Korsok, 1959).

Because many manufacturers were located in towns with a negligible base of opposition, they were essentially exempt from any nuisance laws and were thus free to operate without any restrictions on noxious odors or objectionable wastes. Such freedoms both attracted nuisance-causing industries to the east side and encouraged them to remain. The packing plants of National City were the first large scale example of this sort of activity. By 1930 large packing interests, such as Swift, Armour, Hunters, and Circle, were active in National City. The offensive qualities of packing plants were some of the first targets of sanitary reformers in the nineteenth century, but National City's operations suffered from few restrictions. In addition to the meat packers, rendering plants and fertilizer operations acquired property in National City and contributed to the large quantities of putrescible wastes of the packing plant city. The packing operations continued into the 1980s.

Other industrial operations grew up either around the fringes of East St. Louis or in adjacent towns. The village of Sauget to the south, originally Monsanto, housed the Commercial Acid works. Monsanto Chemical Company purchased the acid plant in 1917 and acquired a factory capable of producing acids, zinc chloride, phenol, salt cake, and nitric cake. By 1925 it had

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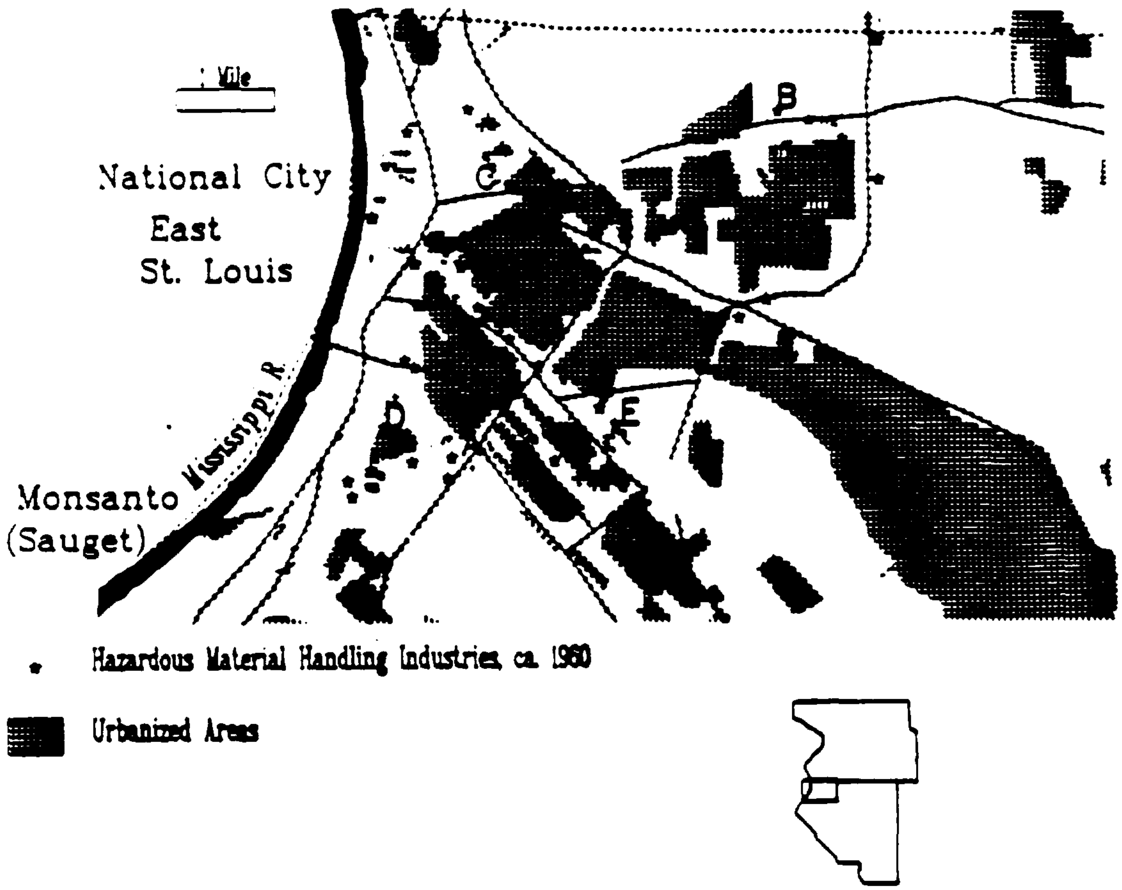

Figure 2.4. Hazardous Material Handling Industries in the East St. Louis Area, ca. 1960. A. Socony Mobil Oil Co., Inc., B. Allied Chemical Corp., C. Hammar Brothers White Lead Company, D. American Zinc Co. of Illinois, E. Aluminum Ore Company of America. Source: IMA, 1960.

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added chlorine to its line of products and chlorobenzols the following year. A line of weed and brush killers was added after 1945, although the production of chlorobenzenes and phenols continued until 1970 when the phenol department was closed (Monsanto Chemical Company, n.d.). There was also a local gas works in East St. Louis from the late nineteenth century into the 1930s, and the 1919 census tallied four chemical manufacturers in East St. Louis. In addition, Socony-Vacuum (later Mobil) established a refinery in East St. Louis, and Allied Chemical had an operation in Fairmont City.

Metal working also clustered near East St. Louis. The Hammar Brothers White Lead Company opened their smelter by 1911 in the northwest corner of town and continued for at least the next two decades. American Zinc (currently Amax Zinc) commenced operations in 1914 and produced brass, prime spelter, sulphuric acid, and zinc oxide (Thomas, 1927: 93). The Aluminum Ore Company of America acquired a large tract of land immediately east of East St. Louis and established the town of Alorton as a base of operations for its aluminum production plant (operations commenced in 1903). There were also numerous foundries and steel fabrication plants serving the railroad industry in St. Louis.

Another major component of the East St. Louis industrial complex was the coal by-product industries. Asphalt roofing products as well as creosote operations also clustered near the rail yards. Paint pigment operations also consumed coal by-products and metals from the smelters (the 1919 census listed five producers of paints).

The East St. Louis industrial district typified the early twentieth-century satellite city described by Graham R. Taylor (1915). There was clear separation of residential and industrial land uses, and the large manufacturing tracts allowed reclamation of poor-quality property through waste dumping.

The vitality of this floodplain complex has been seriously eroded in recent years. National City currently houses no active meatpacking, and employment is down in most other factory districts. Closure of most of the rail yards, abandonment of the packing plants and associated fertilizer works, and modernization of chemical works have vastly changed the nature of the local job situation, but waste generation continues. Three of the older plants (Monsanto, Pfizer, and Cerro Copper) generated over 1,400 tons of RCRA wastes in 1984 (IEPA, 1985). Unrestricted disposal of these substances during the half century before regulation would have introduced tremendous quantities of hazardous wastes to the environment.

2.4.4 Upland Industries

The upland cities never developed the large-scale manufacturing that the cities on the Bottoms did; this came about because they could not offer the immediate proximity to the St. Louis market and labor force, the access to multiple railroads, or the copious freshwater supplies. Both Belleville and Edwardsville were also county seats, providing governmental services to surrounding agricultural and mining communities, and hence never acquired the dependence on industry characteristic of the floodplain cities. Yet, during the late nineteenth century and throughout most of the first half of the twentieth century, there was at least one hazardous waste source in each of the upland towns. Some no longer exist, nor have they existed since the creation of regulatory agencies.

One example of a defunct business is the Kettle River Treating Company's creosoting operation south of Edwardsville (Fig. 2.5a). By the early 1920s, local promoters were hailing it as one of the "world's largest" and it operated at least until 1960 (ESL Chamber of Commerce, ca. 1920 and IMA, 1960). Edwardsville's two other manufacturers which handled hazardous materials were the N.O. Nelson Manufacturing Company, which manufactured lead and brass plumbing and the United States Radiator Corporation. The Nelson Company acquired land for its operation and company town between 1890 and 1895 and reached a peak of 230 employees in the mid-1920s (FWP, 1936). By the late 1930s it was failing. The U.S. Radiator Corporation also enjoyed peak production during the 1920s and closed sometime before 1960.

Collinsville, although not a county seat, experienced limited industrial development (Fig. 2.5b). The first of the hazardous waste generators in Collinsville was the Reichenback Company, a manufacturer of zinc paint pigments which began operation in 1875. It became the Chemical Pigment Company in 1923 and by 1926 had acquired the name of St. Louis Lithopone (FWP, 1936, Sanborn Map Company, 1926). Used intermittently after that date, the paint pigment operations left a large deposit of barium-laden wastes on the south side of Canteen Creek (personal communication, David Webb). A second source of hazardous materials chose Collinsville as a manufacturing site to take advantage of coal prices and low population densities. In 1904 the St. Louis Smelting and Refining Company purchased over 200 acres of land northeast of Collinsville where they produced white lead, basic lead, sulphates, and lead cable. In 1935 the complete operation was dismantled and shipped to Argentina, yet lead slag deposits cover the ground at the former manufacturing site (Gill, 1964, and FWP, 1936).

Belleville was a more important manufacturing center than either of the other two upland cities (Fig. 2.5c). It boasted of its coal mining, a large brewery, and numerous metal-working operations. Between 1883 and 1929 seven foundries, three stove companies, and several primary and metal-finishing companies were founded in Belleville. One of the metal-working industrial cores was west of the intersection of Main Street and the Louisville and Nashville Railroad. A second cluster existed near Richland Creek southwest of the city square, and a third developed along the railroads west of town. Only two sources of RCRA wastes existed in Belleville in recent years and both companies began operations before 1930 (Marsh Stencil-1920 and Peerless Enamel-1928; IEPA, 1985 and Petty, 1939).

A final source of possible hazardous materials in the uplands area was Scott Air Force Base near Belleville (Fig. 1.3). The Army Air Corps established the base in 1917 as a pilot training facility. After World War I it had no regular assigned unit until it became the host installation for a lighter-than-air squadron during the 1930s. During World War II and after, the base resumed functioning as a base for heavier-than-air craft. The primary service of Scott Air Force Base since the 1950s has been as an air transport base (USAF, 1985).

Hazardous materials handled at the site include fuel, oil, PCBs, and solvents. Release of these materials to the environment could have occurred in the form of accidental spills, leaking storage tanks, or intentional landfilling. A review of past waste generation and waste disposal practices indicated three possible sources of environmental contamination at Scott (USAF, 1985). Further investigations have been recommended by the Air Force's study of the base.

Overall, the upland communities never generated the volume of hazardous substances attributed to the industrial complexes on the Bottoms, and the visible evidence of past hazardous waste-related activity is less apparent near the hill towns. Consequently, intrusion on the zones of former industrial activity is more likely in these zones and this has occurred.

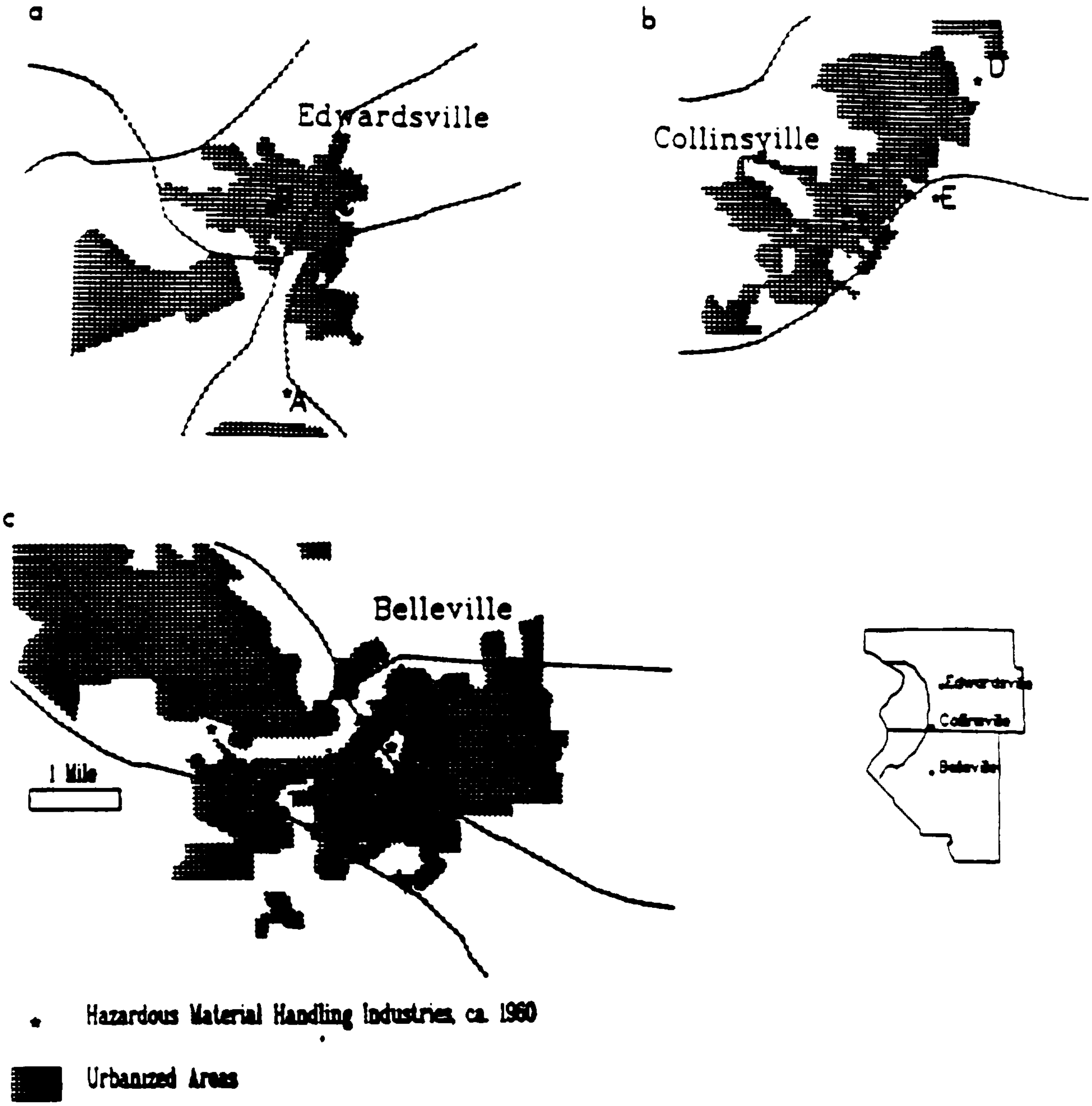


Figure 2.5. Hazardous Material Handling Industries in the Upland Cities, (a) Edwardsville, (b) Collinsville, (c) Belleville, ca. 1960. A. Kettle River Company, B. N.O. Nelson Manufacturing Co., C. United States Radiator Corporation, D. St. Louis Smelting and Refining Company, E. St. Louis Lithopone, F. Marsh Stencil, G. Peerless Enamel Products Co. Source: IMA, 1960.

CHAPTER 3-WASTE MANAGEMENT HISTORY

The development of policies to deal with general urban wastes in the East St. Louis region parallels the sequence observed at the national level (Tarr, 1984). Early twentieth-century concerns focused on putrescible wastes, and only in recent years has serious attention been devoted to non-biological industrial wastes. There were periodic attempts to control airborne emissions of factory wastes in the early twentieth century, but most of the objections to industrial smoke came from Missouri. Thus, attempts to control smoke were hampered by the limits of state and municipal jurisdictions. While St. Louis residents endured the seasonal effects of inversions and smokey skies, east side communities witnessed the accumulation of industrial solid wastes across the American Bottoms. Low marshy areas, meander scars, and abandoned stream channels provided excellent repositories for factory refuse, and the concentration of manufacturing on the Bottoms brought the source of wastes into position to utilize these topographic receptacles. With no restrictive regulations, industry operated in an uninhibited manner and contributed to a wholesale transformation of the floodplain. Filling of lakes and marshes was considered a form of land reclamation and a benefit to area residents and businesses. In addition, throughout most of the study period, factories were relatively free to release liquid effluent into the nearest water body. However, in recent years the effects of unregulated dumping have prompted a reexamination of old policies and the enforcement of new regulations.

3.1 Early Practices, 1870-1930

3.1.1 Municipal Concerns and Activities

City codes in the early 1900s reflected the Progressive-Era connection of moral order and civic cleanliness. These codes relied on "nuisance statutes" to control the possible outbreak of epidemic diseases and "immoral" behavior. Nuisances, broadly defined, included barnyard animals, standing water, offensive odors, and brothels. Implementation of nuisance ordinances effectively forbade the keeping of animals within the city, the dumping of biological wastes in the streets or in streams, and attempted to regulate the industries generating "obnoxious, prejudicial, or detrimental conditions." While these statutes limited the number of farm animals in towns and reduced the amount of garbage in the streets, exceptions were made to accommodate new industries. Granite City's municipal code, for example, prohibited manufacturers which were "noxious, offensive, or injurious," yet when the founding family decided to construct a gas works, the city council promptly granted an exemption (Granite City, 1906: 200). In contrast, nearby Alton, which was not a company town, specifically identified gas works as a nuisance-causing industry, although the law did not close the existing plant (Alton, 1909: 449).

Most attempts to regulate industrial activity focused on those which processed biological products and produced putrescible wastes. Codes specifically identified slaughter houses, packing plants, tallow works, soap plants, rendering works, tanneries, and distilleries as nuisance-producing industries. City codes generally restricted the operation of such manufacturing operations within the city limits, or within a specified distance of the city limits, unless a special permit was granted (East St. Louis, 1908; Alton, 1909). The main reason for such prohibitions was to prevent the accumulation of putrescible substances within the city and thereby reduce the possibility for epidemic diseases to fester in refuse heaps or waterways. The limitations of such codes are obvious in the East St. Louis region with the close proximity of numerous small political units.

Other potential industrial hazards were also addressed by local codes. Most communities prohibited the manufacture of explosives within the city limits and licensed vendors of gunpowder and dynamite. They also regulated the handling of explosive and flammable substances such as gasoline. Thus, city governments attempted to prevent or at least regulate the entry of certain hazardous materials within their municipal limits, yet they formulated more elaborate codes to establish guidelines for the proper removal and disposal of biological wastes (Alton, 1909; ESL, 1908; and Granite City, 1906).

Cities also regulated the dumping of domestic solid wastes, but again chose not to interfere with the dumping of factory solids. Scavengers had to seek permits to haul garbage and codes described proper procedures for moving the garbage through the city. In most communities, the statutes even forbade dumping within a certain distance of the city. Yet no mention was made of factory wastes (Alton, 1909; East St. Louis, 1908; and Granite City, 1906).

Smoke-related issues drew more attention during the early years of this century than solid or liquid factory wastes. In response to complaints, the Federal Lead Company in Alton raised the height of its smokestack to reduce the damage to trees downwind from the plant (Alton Telegraph, 3/28/1923). The lead smelter near Collinsville was also subject to numerous complaints and legal actions resulting from its toxic releases (Gill, 1964). Nevertheless, a general toleration of industrial smoke prevailed on the east side of the Mississippi River during the first third of the century.

Another perceived nuisance was domestic sewage, and municipal attempts to provide sewer service reflects the dominant concern with biological wastes. City codes began to outlaw privy vaults early in this century; in doing so, municipalities had to offer an alternative to local residents. Cities constructed piecemeal sewer systems to transfer domestic wastes from homes and businesses to nearby water bodies. Local codes prescribed the manner of sewer line connections and the licensing of plumbers; they even demanded that factories connect their toilet facilities to the local sewers. The overwhelming concern with biological wastes was not matched in terms of non-biological factory wastes. Other than the nuisance statutes, there were virtually no regulations requiring industries to sewer their effluent along with domestic wastes. Furthermore, lifting wastes into the Mississippi River required expenditures to run the pumps, and by limiting factory effluent in city sewers, municipalities extended the life of their equipment and reduced the operational costs.

The physical construction of sewers came about as a result of increasing population densities in the towns of Madison and St. Clair counties, Progressive-Era politics, and developments in public health practice. Most cities initially allowed residents to construct privy vaults or cesspools on their property or to rely on natural drainage courses. Edwardsville had no sewage system in 1886, although there was one public sewer 200 feet long; but there were no regulations requiring home owners to tie into the main sewer. A State Board of Health report described local practices this way: "Houses drain through cemented socket tiles into natural drains" (Illinois State Board of Health, 1886). However, as the density of residential areas increased, contamination of neighboring wells became common. Two solutions to tainted water supplies were tried: potable water derived from pure sources and public sewer systems. Alton began the process of developing a city-wide sewer system in 1895, and by 1912 the system was at least partially in operation. The problems created by cesspools remained however, for in 1912 the city council debated an ordinance to prohibit cesspools on property fronted by sewer lines (Alton Evening Telegraph, 3/5/1895; 3/20/1912).

East St. Louis residents originally relied on shallow wells to obtain their drinking water, but in 1886 the East St. Louis Interurban Water System was formed to distribute water throughout the city. By the end of the year they served 156 customers and two years later had completed a pair of large settling basins near the riverfront to filter water before delivery (Granite City Jubilee, 1971: 96). A sewer system came about several years later and for different reasons than in Alton. The flood of 1903 inundated much of East St. Louis and prompted numerous attempts to prevent future flooding. The city constructed a protective levee and a "gigantic outlet sewer" to dispose of the city's sewage and flood water (Wilderman and Wilderman, 1907: 755). The low elevation of East St. Louis required that pumps be installed to force the sewage over the levee and this situation has caused continual problems for the removal of sewage from the towns on the American Bottoms.

As in the case of East St. Louis, installation of sewers lagged behind construction of a water supply system in Granite City. When the city streets were laid in 1895, public water lines were also installed. Several years passed before the city council even discussed the question of installing sewers. In 1899 the council approved a plan for a city-wide sewer system and opened bids on the project (Granite City, 1896-1899). As in each of the other cities within the study area, the sewer lines served the domestic neighborhoods and simply carried untreated sewage to a convenient sink; in the case of Granite City and East St. Louis this was the Mississippi River (National Resources Committee, 1937).

Upland residents faced slightly different problems, although they generally relied on similar solutions. Combined sewers, constructed to handle both storm and sanitary sewage, served residential areas exclusively. Belleville constructed one of the first municipal treatment facilities in the two-county region (ca. 1903). The city sewers directed sewage to a large septic tank for biological decomposition of domestic wastes, although by 1916 the septic system was overloaded and declared a nuisance (Belleville Advocate, 1901-1916). This inadequate system continued to pollute Richland Creek into the 1930s (Belleville Daily Advocate, 8/21/1934). Collinsville installed a similar sewer and septic system which ultimately drained half the community into Canteen Creek. As in Belleville, complaints filed by downstream landowners identified the municipality as a source of water pollution (Rivers and Lakes Commission, 1915).

As cities grew, they struggled to extend sewer systems to new neighborhoods, although immediate delivery of such services was not always possible. In fact, timely extension of urban infrastructures commonly lagged behind residential development (Rosen, 1986). East St. Louis announced plans to extend and improve its sewage removal system in 1925 ("Engineering Work," 1925). Yet, surrounding communities such as Landsdowne and Edgemont remained inadequately served a decade later. Alton considered releasing the sewage of new neighborhoods into sinkholes until it was determined they drained into the Mississippi River near the city water intake (Lamar, 1927). The Tri-cities area also was in need of relief sewers in the mid-1930s, as was Collinsville (NRC, 1937). Such short-comings indicate cities were unable to tend even to the wastes they perceived as hazardous, let alone industrial discharges.

The fragmented political nature of the American Bottoms also impeded the creation of a comprehensive sewage removal system. In 1908 the East Side Levee and Sanitary District (ESL&SD) became the first public area-wide organization to attempt to resolve the problem of political fragmentation. Created several years after the 1903 flood (1907), the ESL&SD developed a plan to provide flood protection and drainage for an area in parts of Madison and St. Clair counties, including both the Tri-cities area and East St. Louis. The goal of the organization was to divert Cahokia Creek through a canal north of the industrial communities, construct a complete set of levees along the Mississippi River, and divert runoff from the uplands through a second canal along the western face of the bluffs (ESL&SD, 1910). Although one of the proposed objectives of the ESL&SD was to provide public health services in the form of sewage removal and drainage of stagnant water bodies, its main purpose was to provide flood protection. Nevertheless, it provided a somewhat consolidated system for removing untreated sewage. The Wood River Drainage and Levee District, formed in 1912, centered on the Wood River industrial district and was chartered specifically to provide flood protection, not sanitary services.

The overall condition of urban sewage removal throughout the Madison/St. Clair region in 1930 was typical for the early twentieth century. The sewer systems primarily served domestic customers, collected storm and sanitary sewage into combined drains, and delivered the untreated effluent to convenient waterways. Cities seldom extended public works services as rapidly as outlying districts grew, and those communities with treatment facilities generally overtaxed their limited capacity. Further, the low-lying communities of the American Bottoms faced additional difficulties. Reliant on pumps to remove overflow and sewage, the ESL&SD suffered chronic pump failures during periods of high river stages. This resulted in the accumulation of sediments in backwater lakes and abandoned stream channels when overflow could not be pumped into the Mississippi River. Thus, despite intermittent attempts to provide some form of sanitary sewage service, cities in the study area were only partially served.

3.1.2 Management of Industrial Wastes, 1870-1930

The methods of waste "management" were relatively simple during the early twentieth century: most wastes simply were dumped. Some care was taken to prevent accumulations from interfering with manufacturing processes, and with the adoption of by-product coke ovens there was waste reclamation activity during the 1920s (Gold, et al., 1984). Yet, most wastes were unwanted and perceived as relatively harmless. Consequently, disposal in watercourses and topographic depressions remained the order of the day until well after 1930.

Slaughter houses and packing plants in National City generated large quantities of putrescible wastes, but they also contributed to early waste recovery programs. The St. Clair Board of Supervisors identified Cahokia Creek, which flowed through the stock yards of National City, as a "great menace to East St. Louis" and resolved to create a committee to study the diversion of the creek away from the residential areas of East St. Louis (St. Clair County Board of Supervisors, 5/7/1904). Despite a strong resolve to remedy an offensive situation, the East Side Levee and Sanitary District (ES&LD) reported that "firms and corporations have . . . encroached upon the channel of said Cahokia Creek and obstructed the same so that filth and stagnant pools of water accumulate and stand and contribute a menace to the health of the inhabitants" (ESL&SD, 5/5/1915: 1153). The board ordered their attorney to issue notices to the companies obstructing the creek that they must reopen the channel at their own expense. The following year, however, complaints against the meat packers were filed with the Illinois Rivers and Lakes Commission (1916). By 1925 the stock yards and National City industries had private sewers directing their effluent to the Mississippi River ("Engineering Work," 1925). Although this marked a different method of moving their wastes to the river, the ultimate repository remained the same. Nonetheless, local residents were spared the offensive odors associated with the open Cahokia Creek sewer.

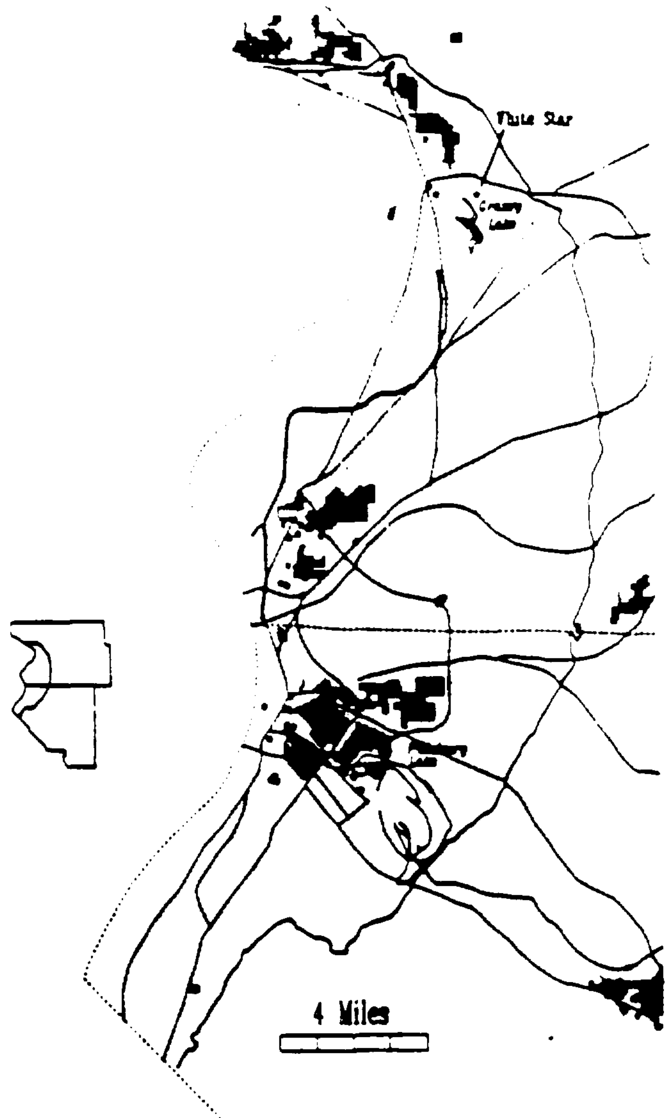
Numerous fertilizer plants, rendering operations, and the tannery in Hartford are examples of early w ste recovery methods associated with meat packing. These plants consumed the bones, fat, an. hides of the cattle and hogs slaughtered in National City. While these operations consumed a large volume of the biological wastes of the packing industry, there were still sufficient quantities of unused wastes to prompt complaints.

Large metal working plants--Granite City Steel, Laclede Steel, Aluminum Ore Company, St. Louis Smelting, and National Lead--all generated substantial volumes of solid wastes. The slag and dross of their operations were used to fill low places on their property or sold for reprocessing or filling off site. The Aluminum Ore Company dumped its slag and sludges into the western end of Pittsburg Lake between 1907 and 1927 (Thomas, 1927: 95). "In the early days the red-mud disposal was made by a little car traveling over narrow gauge tracks under mule power to the edge of the lake. This method was supplanted by a little saddleback locomotive and u-body dump car, still later by pumping" (FWP, East St. Louis File, 1936). After twenty years of such activity, the company had filled only a small portion of the lake and felt that it would remain a satisfactory refuse pit for many years to come (Thomas, 1927: 95).

The ESL&SD used hundreds of railroad carloads of slag from the Granite City steel mill to create revetments during the construction of levees. Between 1914 and 1917, the Board of Trustees reported receiving slag which was heaped up along the banks of the Mississippi River between the northern edge of the district (at the diversion channel) to the riverfront in East St. Louis (ESL&SD, 1914-1917). Laclede Steel built up its low-lying site with its solid wastes and St. Louis Smelting dumped its lead dross on its site where it remains today (beneath a residential development northeast of Collinsville; personal observation). Water passing over and through the slag apparently dissolved lead and carried it into a nearby creek. This caused reports of lead poisoning by people who consumed the Collinsville water (ISWS, Ground-water Section, Collinsville Folder, 1912).

Liquid wastes from the primary metal works contained acids, dissolved metals, phenols, oils, and cyanide (Federal Water Pollution Control Administration, 1967). These wastes were disposed of by a variety of means. Some were discharged to the Mississippi River as in the case of Laclede Steel and American Steel Foundry in Granite City (ISWS, Ground-water Section, Granite City File, 1913) and other facilities made settling basins or evaporation ponds on site for waste treatment (ISWS, Ground-water Section, Granite City File, ca. 1920 and Sanborn Map Company, Alton, 1915). Discharge of acidic wastes into large rivers was considered a safe means of disposal in the early twentieth century. This sentiment was summarized by W. T. Sedwick, an early leader in sanitary engineering, in his testimony on pollution of the Illinois and Mississippi rivers: "the pouring of a large quantity of acid from manufacturing wastes . . . might destroy typhus germs" (Leighton, 1907). Despite an incomplete accounting of all primary metal manufacturers' liquid wastes and given the contemporary attitudes, it is likely that most were released into waterways without treatment.

The oil refineries in the vicinity of Wood River and East St. Louis were another major source of industrial wastes by 1920 (Fig. 3.1). They produced acid sludges, boiler washes, and oily waste waters. Standard Oil (Amoco) installed a sewer from its Wood River site to the Mississippi when it built its refinery (1908) and used this facility to remove its effluent. Initially, Roxana Oil (Shell) allowed its liquid wastes to drain through ditches into Grassy Lake, although it too eventually constructed a sewer to the Mississippi River (ISA, 1932: 15). Both refineries continued their



Documented Hazardous Waste Disposal Sites Before 1930

ESL & SD Levee

Hazardous Material Handling Industries, ca. 1929

Urbanized Area, ca. 1954

Figure 3.1. Documented Hazardous Material Disposal Before 1930. Sources: ISWS, Ground-water Files; IEPA, Water and Land Division Microform Files; and additional sources mentioned in text.

discharges into the Mississippi River through the 1920s. Pressure from the Illinois Sanitary Water Board (formed in 1928) prompted both to install separators in 1935 and thereby decrease the amount of oil flowing from their sewers ("Abatement . . . ," 1936: 18).

A neighboring refinery followed a less costly method of waste disposal which brought about legal action to halt the open dumping of its effluent. White Star Refinery constructed its plant in 1919 and installed no sewer to the Mississippi River. The company dug a series of lateral ditches across their property and connected them to a larger ditch which drained into the northern end of Grassy Lake (Fig. 3.1). They allowed "escaped oil and the heavier refuse" from the refining operation to flow through the open sewers. At some time during the 1920s they installed "traps" to collect some of the oily wastes, and began to store heavy sludges and wastes in pits on their property. Periodically, the company burned the collected refuse, but the collection system did not prevent all oil and acids from leaving their property. By 1925 vegetation in Grassy Lake "began to wither and die," and this in turn deterred waterfowl from visiting the popular sportsman's lake. In addition, a layer of "thick or heavy oily substance" four to five inches thick settled on the bottom of the northern portion of the lake's bed. Chemical analysis of the lake's water indicated the Hartford tannery released chromium into the lake as well. Oil floating on the lake's surface allowed fires to erupt in 1925 and 1928 (ISA, 1932: 15-20 and Alton Evening Telegraph, 7/13/1928: 1). In fact, the 1928 fire raged out of control for more than six hours and engulfed several storage tanks of the White Star Refinery (Alton Evening Telegraph, 7/13/1928: 1-2).

In 1929, owners of property containing a portion of Grassy Lake filed an injunction against the refinery to halt their discharges into the lake. A Madison County Master in Chancery found White Star Refinery guilty of maintaining a nuisance and ordered the refinery to halt its discharges to the lake. A year later the state supreme court upheld this ruling (ISA, 1932: 21-23; and ISA, 1933). The court, however, awarded no damages to the landowners nor did they prescribe a remedy for controlling the discharge from the refinery. Nevertheless, the court action effectively closed the refinery which went out of operation in the mid-1930s.

The Socony-Vacuum Company (Mobil) refinery in East St. Louis received little attention from either the Rivers and Lakes Commission or the Sanitary Water Board; hence, there are no clear indications how it handled its wastes. Situated downstream from the St. Louis and East St. Louis water intakes, it may have been free to discharge wastes into the Mississippi River without attracting attention.

Other chemical and manufacturing plants in the East St. Louis vicinity were able to do just that. In 1932, the village of Sauget proposed to extend its sewer system to serve both the Monsanto and Federal Chemical companies, although the system offered no treatment (ISWS Files, Ground-water Section, Sauget, 1932). Liquids and some solids were dumped on site as indicated by a 1942 plan of the Monsanto plant revealing that a pair of "toxic dumps" along with a "phenol residue dump" existed on the company property (ISWS Files, Ground-water Section, Sauget, 1942).

Other documented incidents of industrial waste disposal point to unchecked use of waterways before 1930. Wastes from an artificial leather (scrap leather pressed and glued into shoe soles) works near Caseyville killed fish in Canteen Creek and rendered the water useless for livestock consumption (ISWS, Ground-water Section, Granite City File, 1912). Richland Creek pollution in 1915 was attributed to municipal sewage and also brewery slop, rendering shop wastes, and coal mine runoff (ISWS, Ground-water Section, Belleville File, 1915).

A source of long-term hazardous substances were the local gas works in most of the larger towns in the study area. Erected during the mid- to late-nineteenth century, they produced coal gas for street lights. The East St. Louis Gas Works was built in 1874 and operated until sometime between 1911 and 1928. Archaeological excavations indicate oily sands still exist underneath the site (IDOT, 1982: 192-198). Alton, Granite City, Edwardsville, and Belleville also had gas works which are likely sources of hazardous materials.

3.2 Recent Waste Management History, 1930-1980

During the last half century there has been a marked increase in the sewage treatment service available to municipalities and industries in the East St. Louis region. Federal funding for Works Project Administration and National Recovery Act projects brought about initial advances in the construction of public sewers and treatment facilities. Piecemeal construction throughout the 1940s and 1950s was followed by changes in federal and state water pollution regulations in the 1960s which prompted modernization or construction of municipal treatment works. The shift in focus from water quality to effluent limitations during the 1970s encouraged further improvements, both in terms of municipal facilities and industrial treatment practices.

3.2.1 Municipal Wastes and Treatment Services

As late as 1937, the National Resources Committee surveyed municipal waste treatment facilities in the St. Louis region and concluded that "[a]t present all sewage and industrial waste from the communities in the St. Louis region are discharged into the Mississippi without any treatment "(NRC, 1937: 65). Towns discharged their domestic, storm, and industrial sewage via water carriage systems built as the communities grew. The NRC expressed grave concern with the inadequate sewer capacity and the need for sanitary sewers on the east side of the Mississippi River. Their recommendations included preparation of plans and construction of improved sewer systems and treatment plants for most of the east side communities (NRC, 1937). Construction of treatment facilities took place in Collinsville, Belleville, and Edwardsville, while cities on the American Bottoms were unable to receive any improved service (Fig. 3.2a; Illinois Sanitary Water Board, 1949). State-wide, Illinois increased the proportion of its cities receiving sewage service from 44 percent in 1930 to over 90 percent fifteen years later (IEPA, 1970). The larger population centers of the region remained without sewage treatment, although for the state as a whole, the percentage of residents served by treatment works rose dramatically during this period (IEPA, 1970).

The absence of treatment in cities on the American Bottoms became apparent in the early 1950s when commercial fishermen on the Mississippi River complained of foreign tastes in their catch. They expressed concern that the undesirable tastes were the result of municipal and industrial sewage dumped into the river in the vicinity of St. Louis. A survey of pollution sources revealed the haphazard approach to the removal of urban sewage. There were forty-five sewer outlets on the Illinois side of the river between Alton and Monsanto (Sauget), and all the municipal outlets were combined sewers, handling storm and sanitary wastes. Illinois communities in the study area provided *no* treatment of the 164 million gallons of general urban sewage released into the Mississippi River daily (Bi-State Development Agency, 1954).

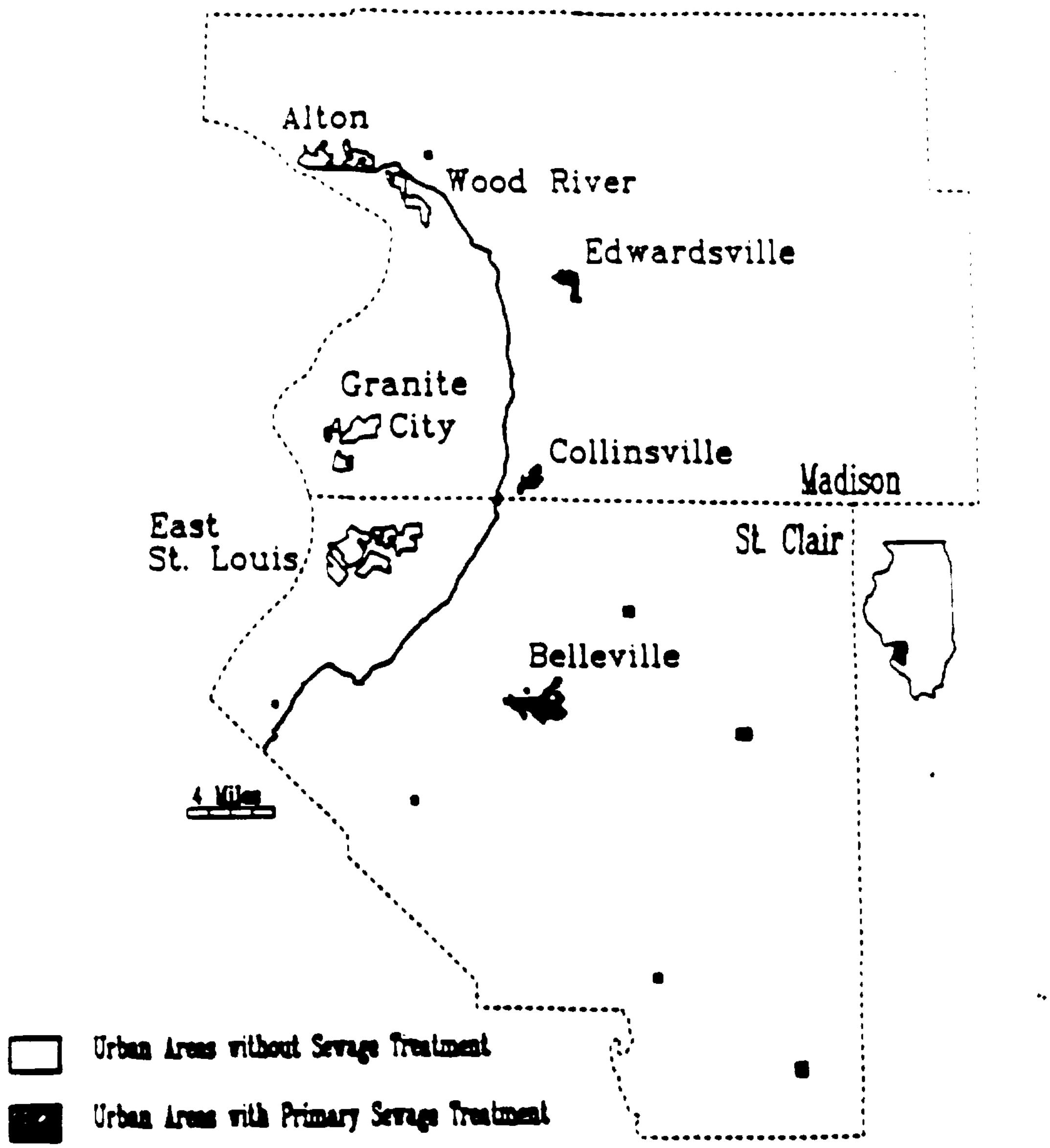


Figure 3.2a. Municipal Waste Treatment Service Areas, 1949. Source: Illinois State Sanitary Water Board, 1949.

There was no appreciable improvement in the manner of municipal waste treatment between 1949 and 1957. The U.S. Department of Health, Education, and Welfare's accounting showed that only the upland towns in Madison and St. Clair counties had primary treatment facilities (USHEW, 1957). A similar survey compiled in 1962 indicated that the oil refinery towns of Hartford, Roxana, and Wood River had added primary treatment (Fig. 3.2b), but the other industrial centers on the American Bottoms remained without treatment (USHEW, 1962). By 1971 progress had been made however (Fig. 3.2c). Alton completed its primary treatment facility in 1967, and East Alton and Granite City also had installed sewage treatment works (Southwest Illinois Metropolitan Area Planning Commission, 1971). Alton's plant treated primarily domestic wastes. Granite City's plant handled industrial wastes from all but one factory in the city (Granite City Steel), but the strength and quantity of the industrial discharges caused periodic damage to the facility (SIMAPC, 1972: 66-69). Improvements installed during the 1960s reflected plans drawn up by federal and state authorities to insure primary treatment by late 1967. The Sanitary Water Board was already calling for secondary treatment by 1982 when Alton became the last city in Illinois to initiate operation of its primary plant (IEPA Files, Div. Water Pollution, Correspondence 1/7/1969, C.W. Klassen to Alton Mayor).

The city of East St. Louis began operating a primary treatment plant in 1966, but industrial wastes which were improperly accepted by the plant rendered it unserviceable by 1967. With federal support, East St. Louis was able to repair the plant and resume primary treatment by 1971 (ESL Journal, 1/13/1971). Troubles continued to plague the East St. Louis sewer system, however. New sewers on the south side of East St. Louis initially were connected to trunk lines which bypassed the treatment facility, and high flood stages caused interruptions in service (ESL Journal, 6/18/1973). Both situations allowed untreated wastes to enter the Mississippi River temporarily, and part of the untreated effluent included industrial wastes. The East Side Levee and Sanitary District served communities surrounding East St. Louis, including Venice, Cahokia, Centreville, Alorton, Fairmont, and Edgemont, and by the early 1970s, the ESL&SD had four primary treatment plants within its service area (ESL Journal, 1/13/1971).

The village of Monsanto (Sauget) completed its sewage treatment plant, at the urgings of the Sanitary Water Board, in 1966. As originally designed, the plant was a primary treatment facility and was intended to serve both the domestic users and seven major manufacturers in Monsanto (ESL Journal, 5/27/1966).

Upland communities pioneered the adoption of primary waste treatment and also secondary waste treatment. Collinsville, Belleville, and Edwardsville all had secondary facilities in 1971, while among the lowland towns only Roxana and South Roxana could offer such service (SIMAPC, 1971). By 1978 Granite City had added secondary treatment, but primary treatment remained the dominant form of treatment for larger communities. Treatment of domestic wastes in small, dispersed rural hamlets and subdivisions became much more common during the 1970s (SIMAPC, 1978).

The overall progress of municipal waste treatment during the past half century has seen the incorporation of more areas within the zone served by treatment facilities. A larger share of the wastes are now receiving secondary treatment, although joint treatment of municipal and industrial wastes has declined with the rise of effluent guidelines. It must be emphasized, however, that treatment plants designed to handle domestic wastes did little to reduce toxic pollutants in municipal waste streams (Miller and Burch, 1981).

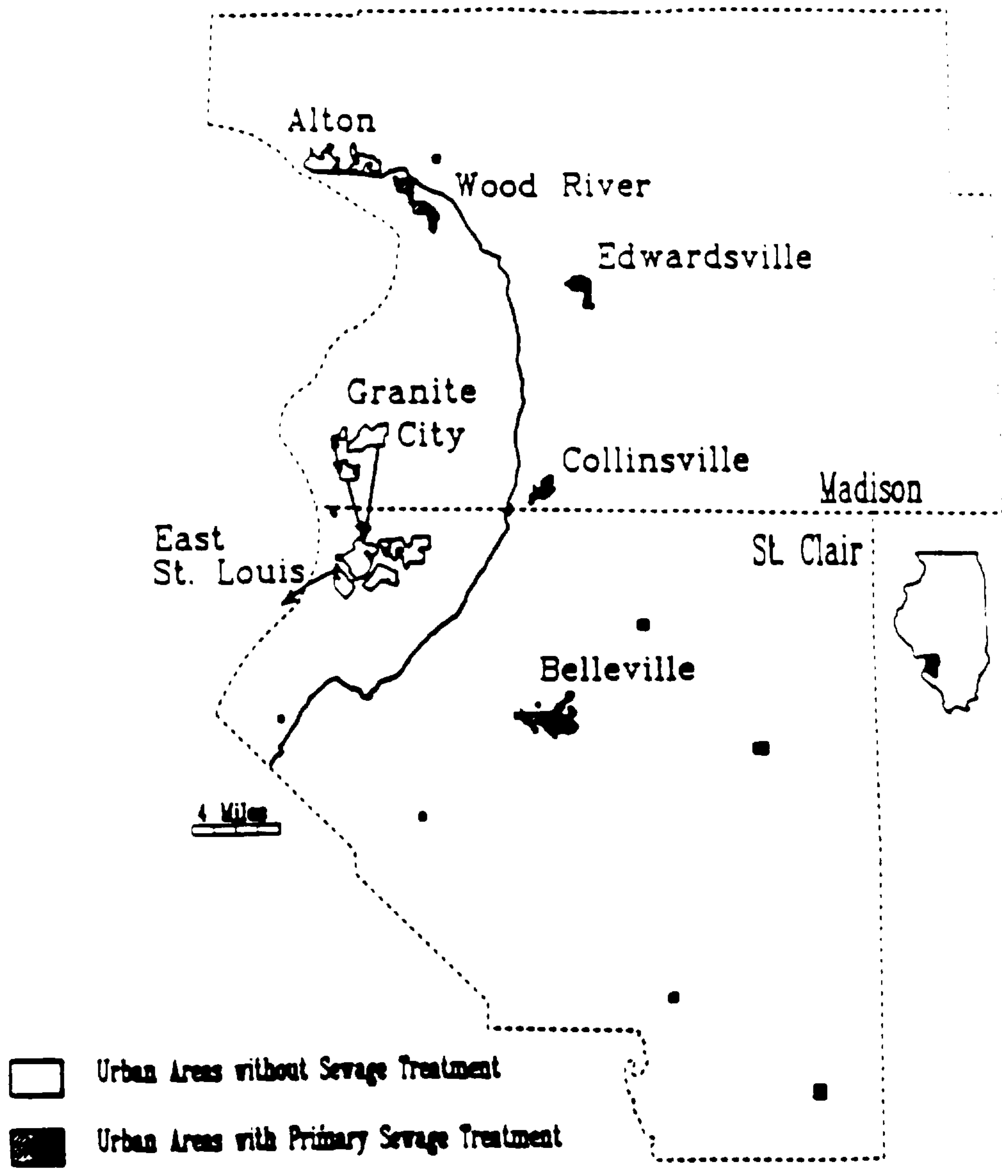


Figure 3.2b. Municipal Waste Treatment Service Areas, 1962. Source: USHEW, 1962.

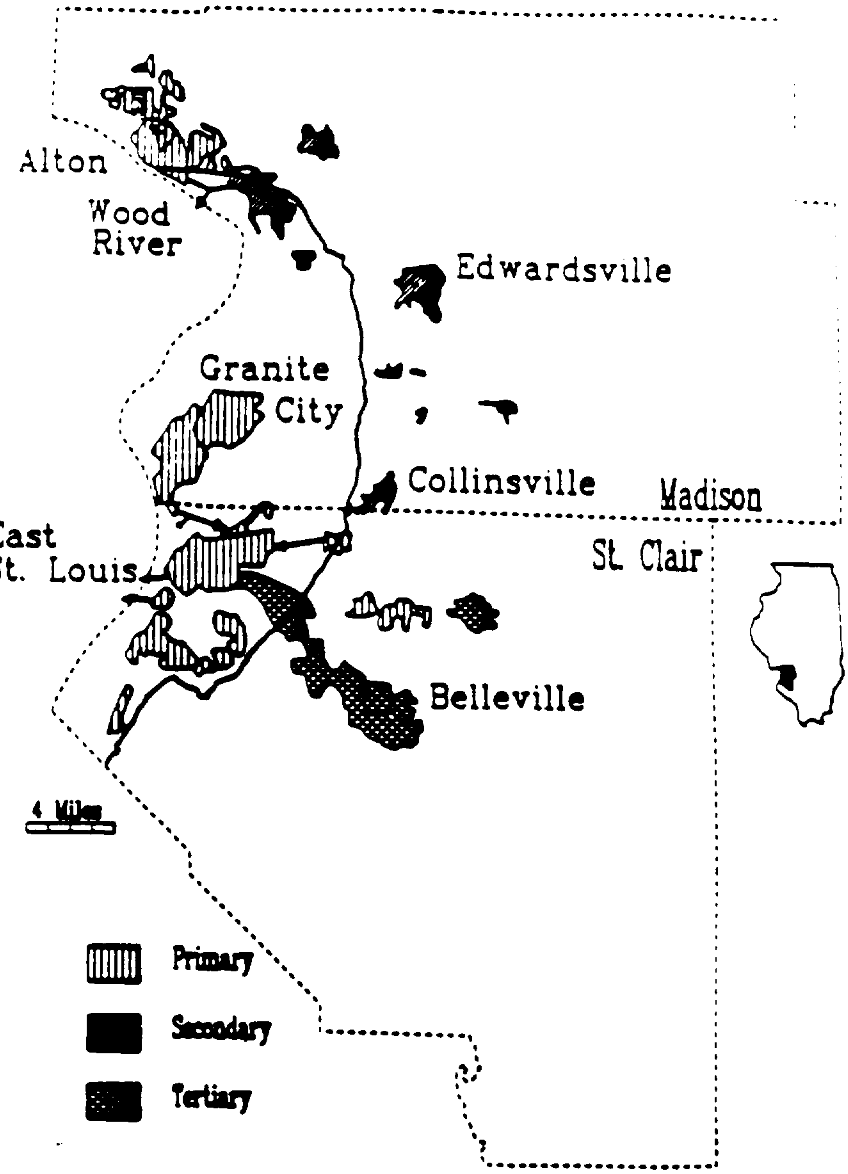


Figure 3.2c. Municipal Waste Treatment Service Areas, 1972. Source: SIMAPC, 1972.

3.2.2 Industrial Waste Management, 1930-1980

There was an unprecedented amount of research conducted during the 1930s on the treatment of industrial wastes. Researchers remained convinced that natural stream self-purification would clear waterways, but they faced increasing loads of biological wastes. As a consequence, sanitary engineers focused their efforts on the treatment of effluent carrying large quantities of putrescible substances, which constituted the largest share of industrial discharges. Furthermore, factory wastes constituted only half the total volume of all urban sewage; hence, putrescible wastes remained a research priority (Eldridge, 1942: 1-4). There was growing concern with acidic and phenolic wastes, but recovery rather than treatment was seen as a solution. A search for marketable by-products proved futile, and without a return on their treatment investment, factory managers were reluctant to install treatment facilities (Colten, 1988).

Throughout the 1950s, sanitary engineers encouraged the adoption of primary and sanitary treatment facilities, although textbooks on industrial waste treatment continued to emphasize the need to treat biological wastes. Advocates of waste treatment took a slightly stronger position than in past decades. Willem Rudolfs (1950: 5), a pioneer in industrial waste management research, not only supported waste management, but he proclaimed that it should not be a secondary concern of industrial managers. Instead, he stated it should be considered an integral part of the production process. By the 1960s, environmental engineers insisted that factories should construct waste treatment facilities as part of their plants, despite short-term costs (Nemerow, 1971). Such statements reflected the passage of federal water pollution control laws, but also suggest the underlying frustration endured by environmental engineers who had to convince factory owners to treat their effluent (Petulla, 1987). Short-term costs remained a vital concern to management and, when possible, inexpensive treatment systems such as lagoons took precedence over more sophisticated technologies.

While industrial effluent composed 50 percent of all liquid sewage nationally, in heavily industrialized areas the proportion was higher. In the St. Louis region, approximately 80 percent of all public sewage came from industry—and almost none received treatment in 1954 (Bi-State Development Agency, 1954). The five factory waste streams analyzed by the 1954 study contained more than 41 million gallons of effluent daily. The two refineries in the survey (Shell and Standard) had separators which removed surface oil from their discharges. International Shoe had lagoons in place and also weirs to remove solids from the overflow from its lagoons. The survey mentions no other primary treatment facility. Chemical analysis of the effluent indicated high phenol and oil concentrations in the vicinity of the outlets from the refineries, East St. Louis, and Monsanto (Sauget). Both East St. Louis and Monsanto (Sauget) sewers carried effluent from local manufacturers. Granite City sewers also handled untreated factory sewage, but analysis did not reveal high concentrations of phenols or oils there (Bi-State Development Agency, 1954). While this early survey does not present a complete accounting of industrial waste management practices, it indicates that there was only minimal treatment and the level of treatment had changed little since the mid-1930s when the refineries first installed oil collecting devices.

A few years later, another survey compiled a slightly more detailed listing of waste treatment facilities, although it showed little change in how liquid wastes were handled. In the Alton area, Laclede Steel, American Smelting, and Owens-Illinois all discharged their untreated wastes into the Mississippi River. Alton Box Board took "good housekeeping" measures to prevent its effluent from entering the river—exactly what those measures were is uncertain, although in later years they employed lagoons. Western Cartridge (Olin) provided no treatment for its wastes before releasing them into Wood River (USHEW, 1957).

Despite the fact that the Wood River area refineries had separators to collect oily wastes from their effluent, these systems were not infallible. In 1948 the East St. Louis Interurban Water Company complained that "[f]or a period of several weeks oil wastes from the Wood River refineries have been entering the Mississippi River in quantities far beyond the normal tolerance rate" (IEPA, Div. Water Pollution Files, Correspondence, 12/21/1948). Over the course of the next few years, there were repeated incidents of phenol releases tainting the East St. Louis water supply. The Sanitary Water Board rebuked St. Clair Refining Company in 1950 and Sinclair Oil Company in 1951 for allowing phenols to enter the river (IEPA, Div. Water Pollution Files, Correspondence 12/20/1950 and 12/26/1951). In an effort to curb the problem, the Sanitary Water Board requested discharge measurements and analysis from Standard Oil. The refinery complied, reporting that their separators collected 18,011 barrels of oil during January of 1953 and that the effluent entering the river contained only 30 parts per million of oil (IEPA, Div. Water Pollution Files, Correspondence, 2/10/1953). Closer scrutiny by the Sanitary Water Board induced the refineries to construct lagoons as waste management facilities. Sinclair Oil Company installed its aeration lagoon in 1956, Standard (Amoco) began using lagoons at about the same time, while Shell added a trickling filter and lagoons in 1958 (ESL Journal, 12/24/1981). The Shell Oil Company system was designed to eliminate phenols, sulfides, oils, and mercaptans, and the aeration basin and retention ponds were lined to prevent percolation of waste liquids into the soil. The design also called for sludges and skim oil to be returned to the refinery for further processing (Russel, Russel, and Wenger, 1957). Although the refineries reduced their releases to the Mississippi River, the accumulation of oils and toxic metals took place in the lagoons.

Industrial waste treatment was virtually absent in the Granite City area through 1960. Although the Koppers Coke Works installed a primary treatment system in the 1940s, it was abandoned shortly thereafter. In the early 1950s, the coke company impounded gas-wash water with the intent of recovering iron ore, but large quantities were released directly to Horseshoe Lake (ISWS, Ground-water Section, Correspondence 7/12/1951). The 1957 survey of waste treatment facilities showed no Granite City industries treating their wastes before the local sewage system pumped them into the Mississippi River (USHEW, 1957). Several years later, Granite City Steel announced plans to construct its own treatment works to handle its 35 million gallons per day of wastes. The city continued to pump the wastes of other industries. This included chromium- and nickel-laden wastes from Diamond Plating, a chromic acid solution from NESCO, and National Lead's cooling water. The total volume of effluent from Granite City manufacturers was 9.6 million gallons a day. In addition, a scavenger service periodically hauled away paint sludge from the A.O. Smith Company, a manufacturer of automobile frames (Sheppard, Morgan and Schwaab, 1961).

A 1942 survey listed the following East St. Louis area industries:

Monsanto Chemical	Federal Chemical
American Zinc	U.S. Chemical Warfare Service
Lubrite Refining	Darling Fertilizer
Lewin Metals	Union Electric
Sterling Steel	Midwest Rubber Reclaiming.

Before and during the 1950s, they had no municipal treatment available. Monsanto (Sauget) area industries reportedly discharged wastes into the open ditch (Dead Creek) flowing to Cahokia. Residents along the creek sued the industries and won a $4,000 nuisance award. Yet the Illinois Sanitary Water Board report concluded that it "is felt that even though industrial wastes would have a slight odor their discharge to the ditch would be beneficial since the great volume would flush settled solids into the Mississippi" (IEPA, Div. Land Pollution Files, Hasfurther, 1942:1-2).

A follow-up survey of industrial discharges in 1947 identified several primary waste management procedures being used in the East St. Louis area. Since 1945, Socony-Vacuum Oil Company (Mobil) had removed oil from its waste water (ESL Journal, 12/42/1981), and the 1947 survey reported that the company produced no acid sludges and sold all its caustic treating solution to another company which reclaimed the phenols (IEPA, Div. of Land Pollution Files, Troemper, 1947: 4-5). American Zinc recovered various by-products and allowed only cooling water and small spills to escape to the Mississippi. The Moss Tie Company discharged all process wastes to a lagoon on site where they were allowed to "seep into the soil." Midwest Rubber Reclaiming Company released naptha, sulfides, polysulfides, and pine tar into its sewage which entered the Mississippi River. Although the report did not determine which industries were responsible for causing river fish to taste foul, it suggested that Midwest Rubber, Monsanto Chemical, and Socony Vacuum were the most likely sources (IEPA, Div. of Land Pollution Files, Troemper, 1947: 2-6).

By the late 1950s Monsanto Company practiced "good housekeeping" (USHEW, 1957). Sewer plans and company blueprints suggest good housekeeping consisted of sewering liquid wastes to the Mississippi River and landfilling solids on site. The 1959 liquid waste stream contained high concentrations of phenols and aromatic compounds (IEPA, Div. of Water Pollution Files, Enviro-Chem Report, 1972). Company records document an "Old Toxic Dump" in 1945 (IEPA, Div. Water Pollution Files, Monsanto Plan, 1945). Numerous other landfills have been identified in the course of recent investigations by the IEPA (Ecology and Environment, 1986). Pfizer Pigments (the G. S. Mempham Corporation produced pigments at the same site as early as 1920) released its acidic wastes into the East St. Louis sewer system, and this practice continued even after the city built its treatment plant in 1966 (ESL Journal 7/2/71).

By the early 1970s, both Sauget and East St. Louis had installed some form of primary waste treatment, but it did not destroy the toxic metals and phenolic compounds contained in the waste streams handled by those plants. Consequently, commercial fishing was non-existent between St. Louis and Cape Giradeau (IEPA, Div. Water Pollution Files, USEPA Hearings, 12/7/1972).

Industrial waste management progressed from a negligible presence on the American Bottoms in the early 1930s to a slightly more common feature by 1970. Simple filtration or skimming devices constituted the dominant types of equipment employed by industries and cities in the area. Their creation of sludges and collection of sediments reflected the general shift from water to land sinks characteristic of the post-1945 period (Tarr, 1984). While water discharges continued, the concentration of hazardous materials in sludges and their land burial of those sludges had begun by 1970.

By the late 1970s, most industries relied on municipal treatment plants for the final treatment of their effluent. A 1978 inventory (SIMAPC, 1978) reported thirty of forty-three industries sent their effluent to local treatment works, and only a portion provided pretreatment (Table 3.1). Amax Zinc Corporation, a zinc refiner, provided lime neutralization and metals removal, while Monsanto removed mercury from its waste stream. Several hazardous material-handling

Table 3.1. Reported Industrial Waste Treatment, 1978.

Company	To Municipal Sewage Treatment Works: Pretreatment	To Municipal Sewage Treatment Works: No Pretreatment	On-Site Treatment
Arco		X	
Air Products & Chemicals		X	
Alton Box Board			X (?)
Amax Zinc	neutralization metals removal		
American Steel Foundries		X	
Amoco Oil			Primary
A.O. Smith		X	
Cerro Copper	primary settling		
Chemetco			Primary
Clark Oil	separator, activated sludge, dissolved air, flotation		
Conalco		X	
Diamond Plating		X	
Edwin Cooper		X	
Granite City Steel			lagoons, neutralization,
LaClede Steel			aeration, polymer addition, flow clarification
Lanson Chemical	solvent trap		
Midwest Rubber		X	
Monsanto Industrial Chemicals	mercury removal		
Morris Paint		X	
Musick Plating		X	
National Lead		X	
Olin			chemical treatment
Pfizer		X	
Roesch Enamel		X	
Shell	oil separators, lime, slurry absorption, dissolved air flotation, and retention basins		

Source: SIMAPC, 1978

industries provided no pretreatment before discharging their wastes into city sewers (SIMAPC, 1978). In contrast, thirteen industries provided complete treatment on site. These included the oil refineries, Granite City Steel, and Olin Corporation (SIMAPC, 1978). Thus, by 1978 effluent from all forty-three surveyed industries received some form of treatment. This meant the concentrations of hazardous materials released to streams was being reduced; but the volume of sludges and sediments was increasing.

The fact that numerous industrial waste streams received primary or even secondary treatment by the 1970s does not signify hazards were eliminated. The USEPA found that many "priority pollutants" are concentrated in treatment residues. Metals and solvents, in particular, are concentrated in both primary and secondary sludges (USEPA, 1974; see also Miller and Burch, 1981). Among the industries common in the East St. Louis area which generated hazardous sludges were oil refineries, electroplaters, and printing operations (Hunt, et al., 1984).

Although counties and municipalities throughout the region had ordinances requiring the operators of dumps and landfills to seek permits, older records have not been maintained. Thus the only reliable documentation of early land disposal relates directly to on-site industrial dumping rather than mixed municipal landfills. The steel mills (Laclede and Granite City) both created deposits of slag on site and these areas may have been used for the dumping of pickle and quench liquors (Rudolfs, 1953: 374). Monsanto created "toxic dumps" on site and American Zinc piled its sludge on site (IEPA, Div. Water Pollution, Monsanto Plan, 1945). Pre-1930 examples suggest the reclamation of factory property with solid wastes was extremely common, and dumping on site continued into the 1970s. A 1969 survey of landfills listed several manufacturers with disposal facilities on their own property. Included in this list were Granite City Steel, Owens-Illinois and Shell Oil (SIMAPC, 1969). Monsanto Chemical Company requested permission to use part of its property as a "sanitary landfill" in 1968. The company proposed to bury approximately 34,000 cubic yards of still residues, tars, by-products, waste solvents, and filter sludges from its East St. Louis and St. Louis operations (IEPA, IDPH Microfilm, Correspondence, 8/16/1968). Still another example of on-site accumulation of hazardous materials occurred at the Olin Corporation site in East Alton. Nearly seven million pounds of "nonusable explosive wastes" had collected at the old gunpowder plant between 1962 and 1970. The wastes included nearly one million pounds of rocket propellant which contained a large proportion of nitroglycerine (ESL Journal, 12/3/1970). Earlier that same year, Olin had negotiated with the Department of Public Health to dispose of zinc oxide dust at the Barton Landfill, west of Edwardsville.

Better records are available for the period following the passage of the Illinois Refuse Disposal Law (1965), and they indicate the mixing of industrial and municipal wastes took place in remote sites and in wetland areas. One example is the Chouteau Island landfill (Fig. 3.3). Neighbors of the landfill complained to the Sanitary Water Board in 1965 that the operators were dumping "every conceivable kind of trash" in an old borrow pit. They feared their shallow wells would become contaminated. County officials reacted several years later by prohibiting the dumping of out-of-state trash, thus suggesting the problem lay with St. Louis sources not local ones. The dump continued to accept mixed rubbish and in 1968 a young boy was burned by chemical compounds dumped on the surface at the landfill. One year after the accident, the Chouteau Island Corporation applied for a permit to operate a toxic and chemical landfill at the site. Thus the remote island location continued to serve as a mixed refuse landfill site. Although less secluded, the Sauget landfill also received chemical wastes from Missouri and local industrial sources (SIMAPC, 1969: III-6).

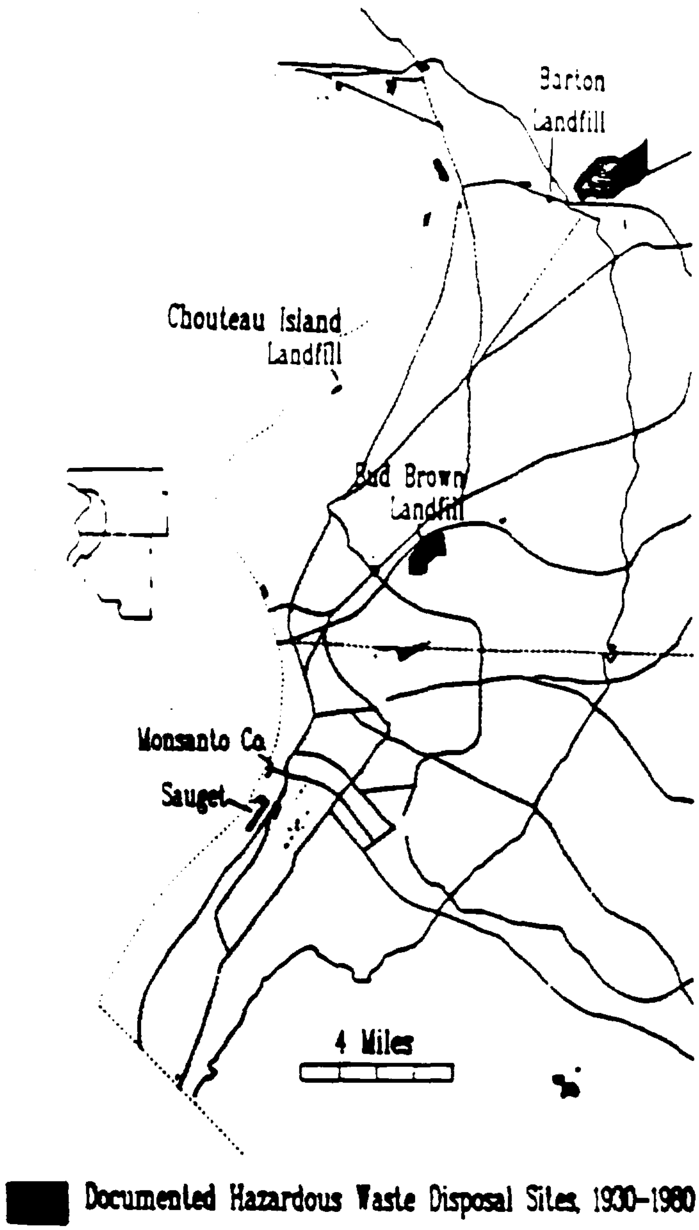


Figure 3.3. Documented Hazardous Waste Disposal, 1930-1980. Sources: ISWS, Groundwater Files; IEPA, Land and Water Division Microform Files; and additional sources mentioned in text.

Communities, private operators, and manufacturers pressed abandoned quarries and strip-mined areas into use as landfills. Several of the Sauget-area sites studied by the IEPA were originally excavated as sand and gravel pits. Contaminated ground water and mixed debris in the area suggests chemical wastes along with general urban refuse were mixed in the former quarries (Ecology and Environment, 1986). Alton converted a former clay pit north of town into a sanitary landfill in 1968 (SIMAPC, 1969), but no reports of industrial refuse being interned there were found. Several small upland communities used former strip mines as community landfills.

A third type of site favored for landfill activity has been the abandoned sloughs, creeks, and shallow lake beds on the American Bottoms. The Bud Brown landfill (Fig. 3.3), one of the more notorious landfills in the two-county region, exemplified this type of site. Located east of the intersection of Interstate Highway 55 and Route 203, Brown owned five tracts of land that were naturally low ground or had been used for borrow pits during the construction of the interstate highway. He acquired them during 1966 and used the property as landfill sites. Before he acquired the property, the land was used as 'rebel dumps' since at least 1964, and neighboring radio broadcast stations complained of uncontrolled fires at the sites. During his operation of the sites, Brown accepted toxic and chemical wastes, along with putrescible rubbish and construction debris (IEPA, Div. of Land Pollution Files, IDPH Microfilm, Misc. Correspondence and Newspaper Clippings). Steps were taken, unsuccessfully, to close the Brown dump, and much of the area today remains in use as a landfill. Hundreds of acres of wetland have been filled over the course of the past twenty years.

A final source of industrial hazards has been air pollution. As noted before 1930 in the vicinity of smelters, airborne contaminants can damage vegetation and cause health problems to humans. During the 1930s and 1940s, renewed efforts to control the smoke nuisance were initiated. Law suits filed by private citizens against chemical companies and primary metal smelters reflect public reaction to industrial emissions. Lillie Wheatley complained that Monsanto Chemical was negligent in releasing gases and chemical substances into the atmosphere which caused respiratory problems. She brought a suit against Monsanto, citing a state nuisance ordinance and won a favorable ruling in the local circuit court in 1938 (Wheatley v. Monsanto, St. Clair Circuit Court, Case 3093). Several farmers in the vicinity of East St. Louis argued before the St. Clair Circuit Court that "various chemicals and acids" released by the American Zinc smelter damaged their crops between 1933 and 1937 (Bertels, et al. v. American Zinc, St. Clair Circuit Court, Case 3203). While it was difficult to prove a specific industry was culpable for low crop yields, the actions of the plaintiffs indicate growing public dissatisfaction with industrial air pollution and the perception that factory emissions were harmful.

Public opposition to smoke forced politicians to enact regulations in St. Louis. The Missouri city passed an anti-smoke law in 1937 which called for washing of low-grade Illinois coal and the establishment of a Smoke Commission (St. Louis Post Dispatch, 2/11/1937). The goal of the Commission was to reduce the amount of smoke produced by industry, railroads, and domestic coal-burning furnaces, although it was not immediately successful. Some manufacturers objected to the law, and, as might be expected, Illinois coal producers strenuously objected. The Belleville Chamber of Commerce even courted Missouri industries, citing the lack of "inhibitive smoke ordinances" as a reason for relocating to Illinois (St. Louis Globe Democrat, 1/21/1937). Smoke accumulations persisted, particularly during the fall when inversions are most common in the St. Louis area (St. Louis Globe Democrat, 11/22/1937 and 12/11/1940). The lingering problem prompted the city to pass a more stringent anti-smoke measure in 1940, which was hailed by the mayor as the "greatest single thing we have ever done in St. Louis" (St. Louis Post Dispatch, 4/8/1940). Although the achievements of the anti-smoke ordinances were not immediately recognizable—in fact one company moved its operation to Indiana because it could not assemble its electric motors in smokey conditions (St. Louis Post Dispatch, 12/11/1940)—there were significant reductions in the level of atmospheric pollution by the 1950s (USHEW, 1966: 5). Several technological developments augmented the smoke ordinances in achieving these results. Not only was lower-sulfur coal burned, but the adoption of diesel locomotives and increasing use of electricity and natural gas to heat homes further enhanced the legislative approach to air pollution control.

While the seasonal pall of smoke has largely been eliminated, evidence of lingering effects of air pollution suggests urban industrial pollution can contribute to surface water pollution. Schicht and Huff (1975) measured an unusually large zinc ratio in surface water taken from Indian Creek, leading them to conclude that atmospheric pollution was the source. Other metals and persistent chemicals may exist in areas downwind from industrial sources of pollution (USEPA, 1985).

3.3 Conclusions

Throughout the greater part of the past half century, there was very little industrial waste treatment. Large quantities of factory effluent flowed through sewers into the Mississippi River and on toward the Gulf of Mexico. There were other water repositories which were less efficient in removing factory effluent from the region. Grassy Lake, Dead Creek, Horseshoe Lake, Pittsburg Lake, and quite likely Smith Lake received industrial effluent which simply accumulated *in situ*. Given the common waste management practices and the frequent choice of low wetlands as industrial dumping sites, all former lakes and stream channels downgradient from or in the vicinity of hazardous waste sources, past or present, are possible repositories of hazardous materials.

Solids, while less likely to be transported than liquids, are also scattered widely across the American Bottoms. Most industrial sites have been raised by on-site dumping of industrial solids and nearby low areas also received slags, sludges, and mixed urban and factory refuse. The use of landfills as combined municipal and industrial waste disposal grounds, and the nature of much of the chemical wastes produced in the East St. Louis area, make any former landfill site suspect.

CHAPTER 4 - ANALYSIS, CONCLUSIONS, AND RECOMMENDATIONS

The historical juxtaposition of industry and human communities creates several scenarios of possible exposure to hazardous materials. One such situation is the airborne releases of smoke and gases which can affect people downwind from the source. Exposures of this nature are generally shortlived, although deposition of airborne contaminants can occur (Schicht, 1977). Land accumulations of hazardous solids can affect human populations through the release of toxic or explosive gases, contamination of water supplies, or direct contact. Liquid hazards can taint either surface- or ground-water resources, although any of the possible means of exposure require a human presence or use of a contaminated resource. The extensive surface alteration of the American Bottoms, along with population increases after the peak of industrial activity, created situations whereby humans and human activities could have intruded on former zones of accumulation. This chapter will examine a series of maps contrasting waste disposal practices with human use of the study area. This analysis will provide clues to possible past, present, or future exposure to relict hazards.

It must be emphasized that the delimitation of zones of possible exposure does not reflect actual exposure. It merely indicates zones where the conditions for possible exposure existed at some time or may exist in the future. Also, the data used to build the maps for this section are imperfect. Thus, there may be additional zones which are not depicted here.

4.1 Accumulations and Changing Land Uses

Both the sharp break in gradient from the bluffs to the floodplain and the gentle relief of the American Bottoms produced conditions allowing waterborne sediments to accumulate by natural processes. The topography of the floodplain also created ideal locations for the disposal of human wastes. In 1900 there were numerous channels draining the American Bottoms, but the drainage pattern was poorly developed and stream currents were observed to change direction (Helm, 1905). Most streams crossing the Bottoms either flowed into or out of one of the numerous shallow lakes which covered extensive portions of the floodplain (Fig. 4.1). Given these conditions, sedimentation in the form of alluvial fans at the base of the bluffs and small deltas in the bottom-land lakes formed due to the inability of streams to carry a sediment load across the gentle gradient of the floodplain (Hill, et al., 1981). With the formation of the East Side Levee and Sanitary District in 1907, the large-scale disruption of natural drainage commenced. As drainage districts carved new channels across the Bottoms, they left abandoned channels and efficiently diverted upland runoff from the lakes on the floodplain. The loss of surface water in lakes was accelerated by industrial pumpage of ground water, which lowered the water table beneath the major industrial centers. Jointly, these two main human influences reduced the natural lake area of the American Bottoms by more than 40 percent (Bruin and Smith, 1953). Both the former channels, (such as Dead Creek, Wood River, and Cahokia Creek) and lakes (including Smith, Grassy, Horseshoe, and Pittsburg Lake) received sewage and/or solid wastes from municipalities and industries. Severed from their ultimate outlet, or used as final sinks themselves, these topographic depressions became repositories of wastes--some hazardous, some not. There has been little direct encroachment of urban land uses on these former water bodies, but humans live alongside Dead Creek and near reclaimed portions of Pittsburg Lake (Fig. 4.2).

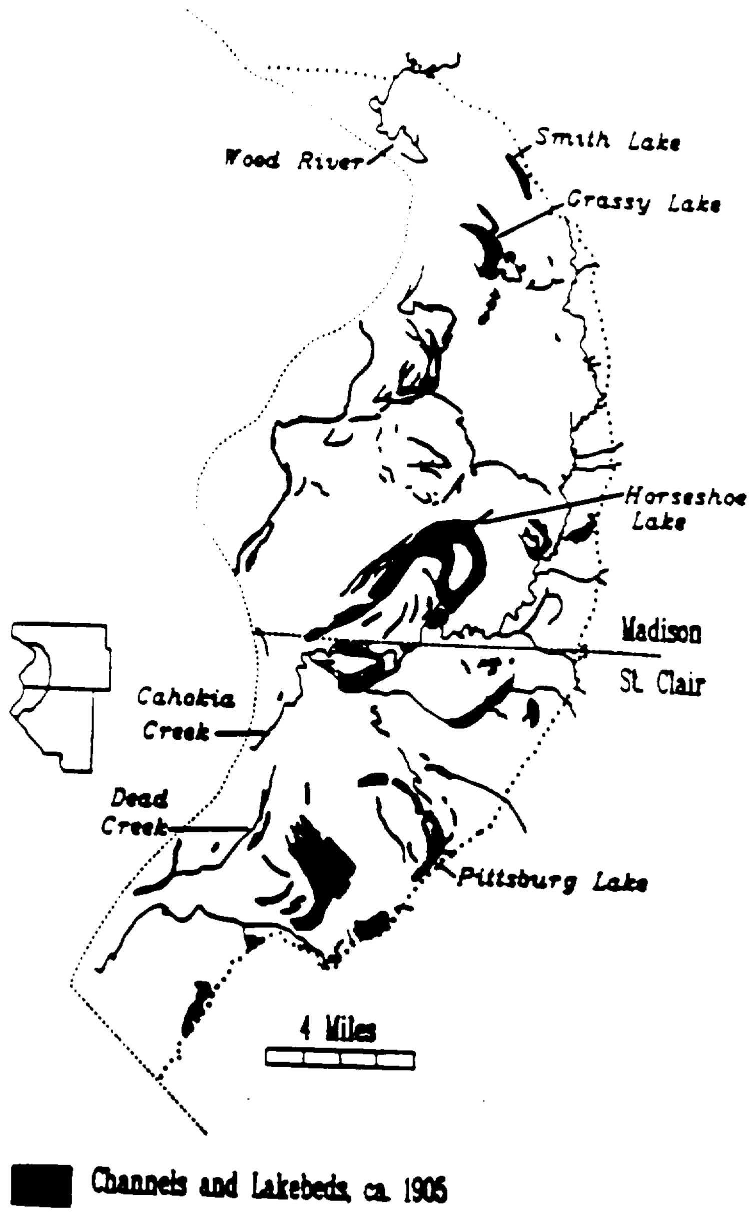


Figure 4.1. Natural Drainage Pattern of the American Bottoms, ca. 1905. Sources: ESL&SD Maps, Wood River Levee District Maps; USGS Topographic Maps.

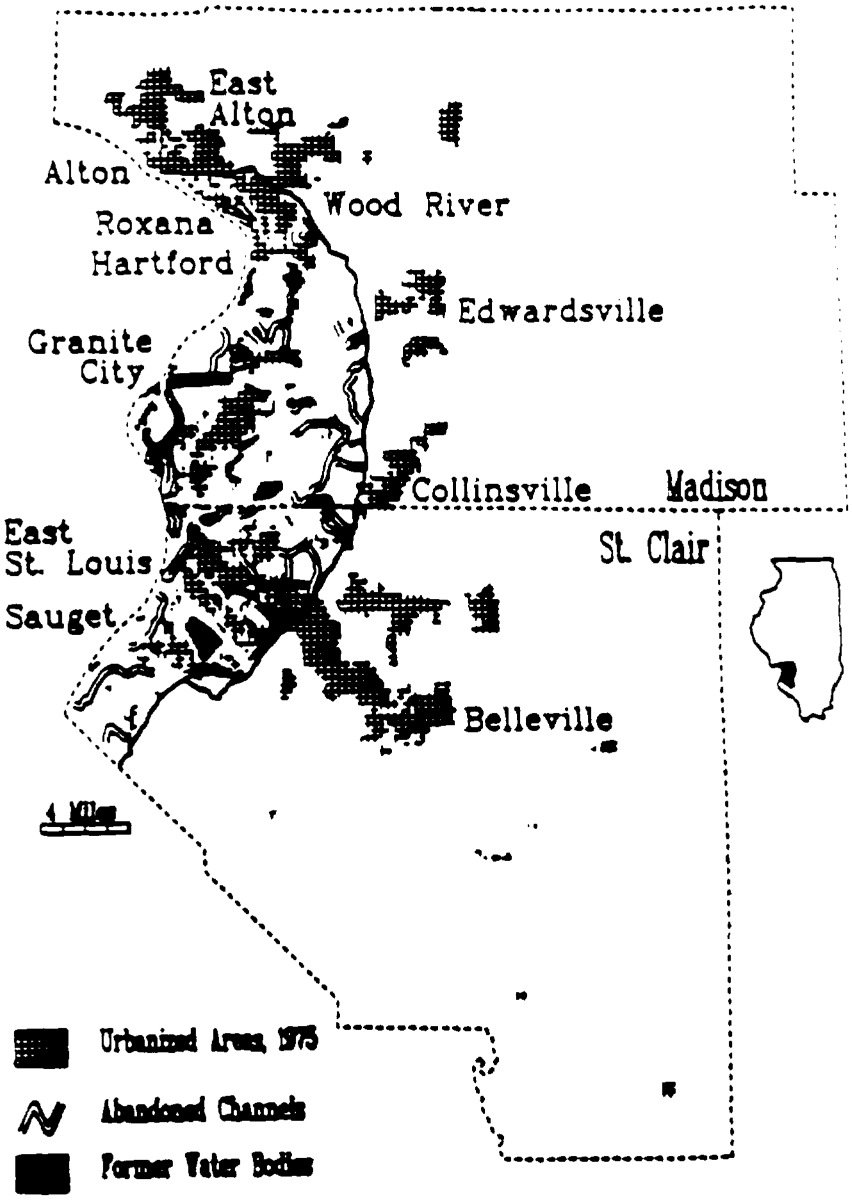


Figure 4.2. Areas of Possible Urban Encroachment on Zones of Accumulation.

Other accumulations occurred in the form of documented disposal of wastes (Fig. 4.3). Subsequent urbanization has created few intrusions on disposal sites. Near Wood River some overlap occurs, the former lead smelter site northeast of Collinsville is now a residential subdivision, and residential construction in Sauget has occupied former disposal grounds (E&E, 1986). The limited amount of residential intrusion on former waste sites indicates reclaimed land has not been perceived as useful for all purposes. Thus, there has been a small amount of the direct, long-term exposure that would be most common among people living directly over a waste site.

4.2 Possible Indirect Exposure

One possible method of human consumption of hazardous substances is ingestion of contaminated ground- or surface-water. Most of the communities on the American Bottoms rely on an interurban water supply system which draws from the Mississippi River; this system also supplies a number of upland communities (cf. Figs. 4.4 and 4.5). Through the 1950s there were frequent reports of phenolic and oil releases into the Mississippi River and the managers of the East St. Louis water plant frequently voiced their objections to the foul tasting water which resulted from discharges upstream. Customers of the water systems were exposed to industrial wastes in a diluted form, although consumption was intermittent. Delivery of tainted water extended from Granite City to Dupo on the Bottoms and to Belleville, Shiloh, and O'Fallon on the uplands. More stringent controls on discharges in recent years and the installation of secondary treatment facilities have reduced the volume of pollution entering the Mississippi River. Thus, although the water delivery system supplied more customers in 1980 than in 1953 (cf. Figs. 4.4 and 4.5), the quality of surface water consumed has improved.

The extensive alluvial deposits of the American Bottoms are underlaid by sand and gravel drift deposits, generally less than fifty feet below the surface. These sand and gravel deposits are one of the principal aquifers in the state of Illinois (Shafer, 1985) and they are susceptible to contamination from the surface (Jacobs, 1971). Although the major population centers have relied on surface water for domestic consumption, several of the smaller communities on the American Bottoms and a number of upland towns pump their domestic water supplies from the shallow sand and gravel aquifers (Figs. 4.4 and 4.5). Wood River, Roxana, and Hartford each has relied on shallow wells since at least the 1920s (Hanson, 1950).

High volume industrial pumping in the vicinity has caused large cones of depression near these communities (Bruin and Smith, 1953; Schicht and Jones, 1962; and Collins and Richards, 1986). These cones of depression, potentiometric lows, form areas of diversion within which ground water tends to move toward the point of withdrawal. Leachate from surface deposits of hazardous materials within the areas of diversion could move toward points of withdrawal, and enter wells in the path of the subterranean plumes. In the early 1950s there was a potentiometric low beneath the Wood River oil refineries which had used Grassy Lake and on-site lagoons (some of which were lined) for disposal of waste products since the 1920s (Fig. 4.6a). In fact, one refinery was recovering refined petroleum products that leaked into shallow aquifers as a means of protecting the quality of the water it was pumping for use in refining operations. Thus, contamination was possible through the 1950s and there were several public water supply wells in the vicinity of the refineries. In recent years, the closure of one refinery (Amoco) and the tannery in Hartford has reduced the volume of possible contaminants. Yet, the existence of documented hazardous material accumulations and a persistence of a potentiometric low beneath the refinery district suggest close ground-water monitoring should be a priority in this area (Fig. 4.6a, b).

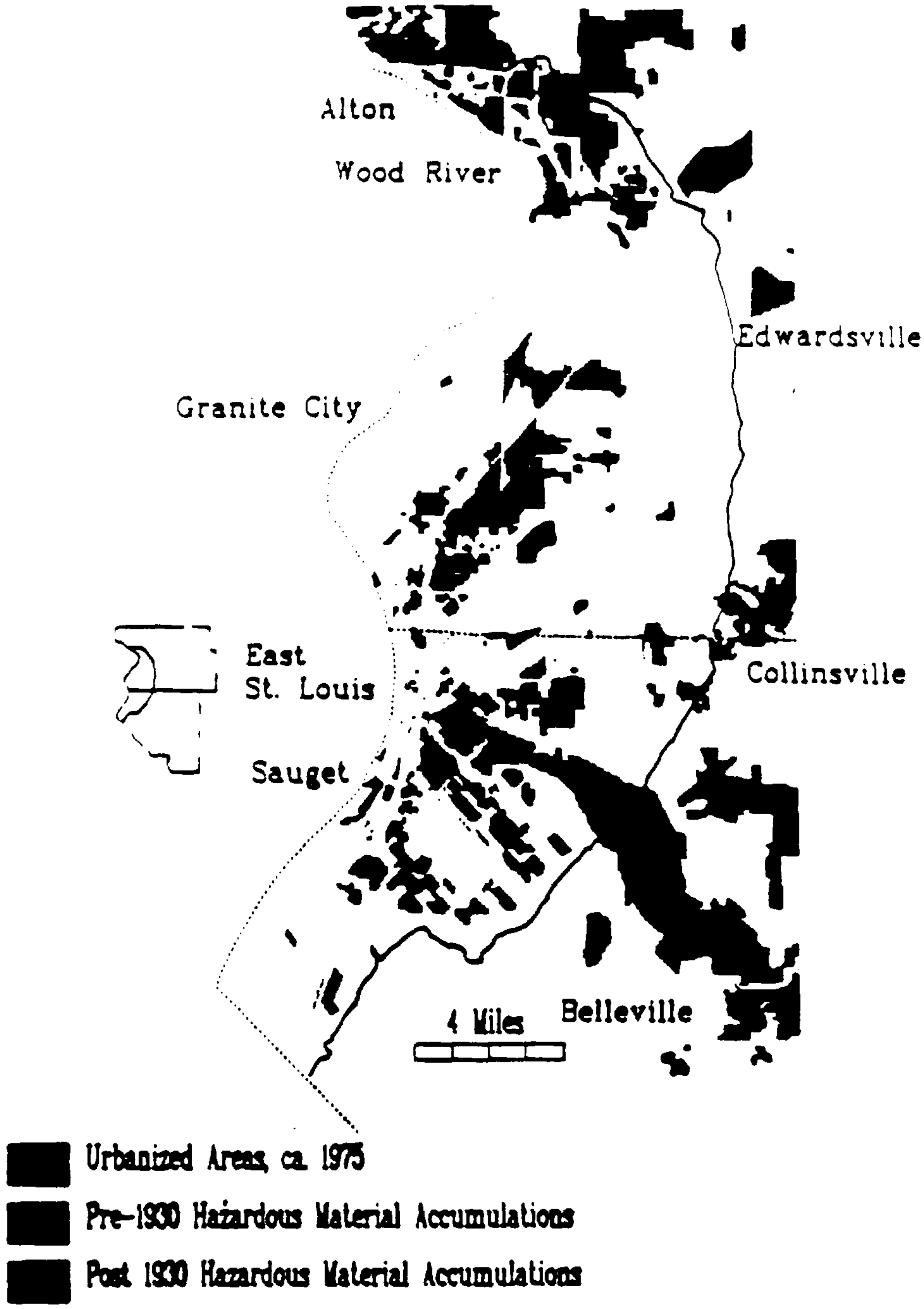


Figure 4.3. Urbanized Areas, ca. 1975 and Areas of Documented Hazardous Material Disposal, 1890-1980.

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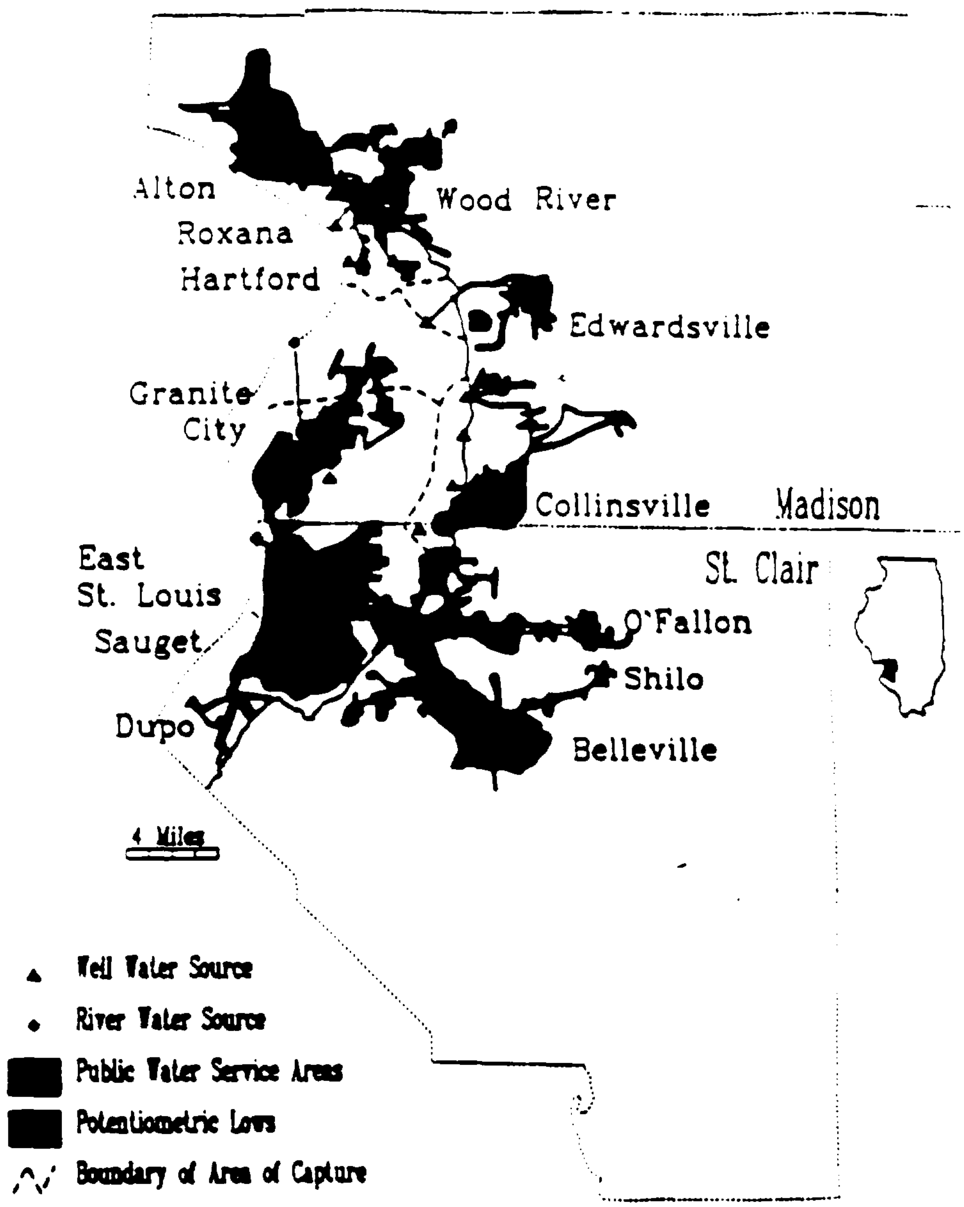

Figure 4.5. Public Water Service Areas and Potentiometric Surfaces, ca. 1980. Source: Collins and Richards, 1986.

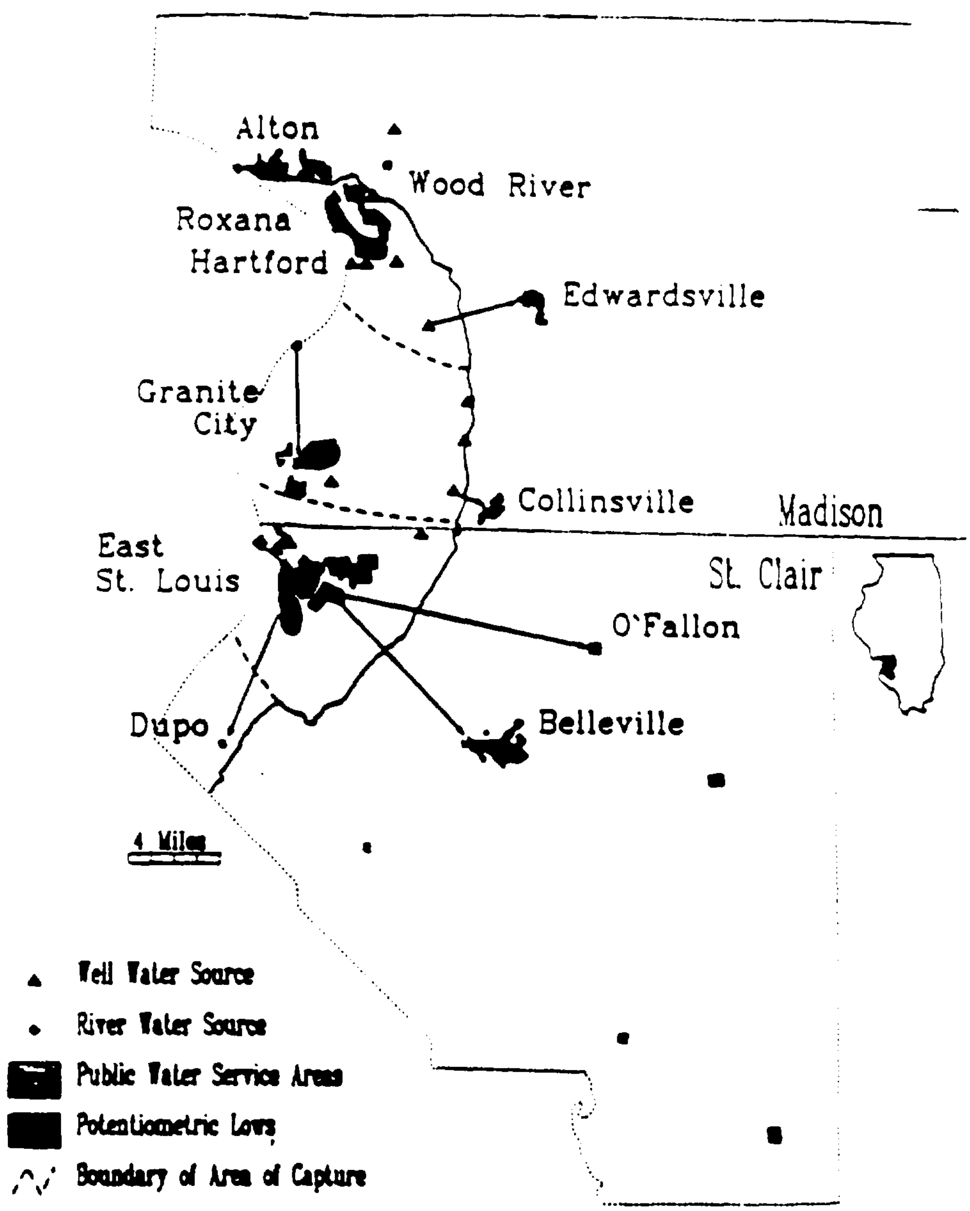

Figure 4.4. Public Water Service Areas and Potentiometric Surfaces, ca. 1953. Sources: Bruin and Smith, 1953.

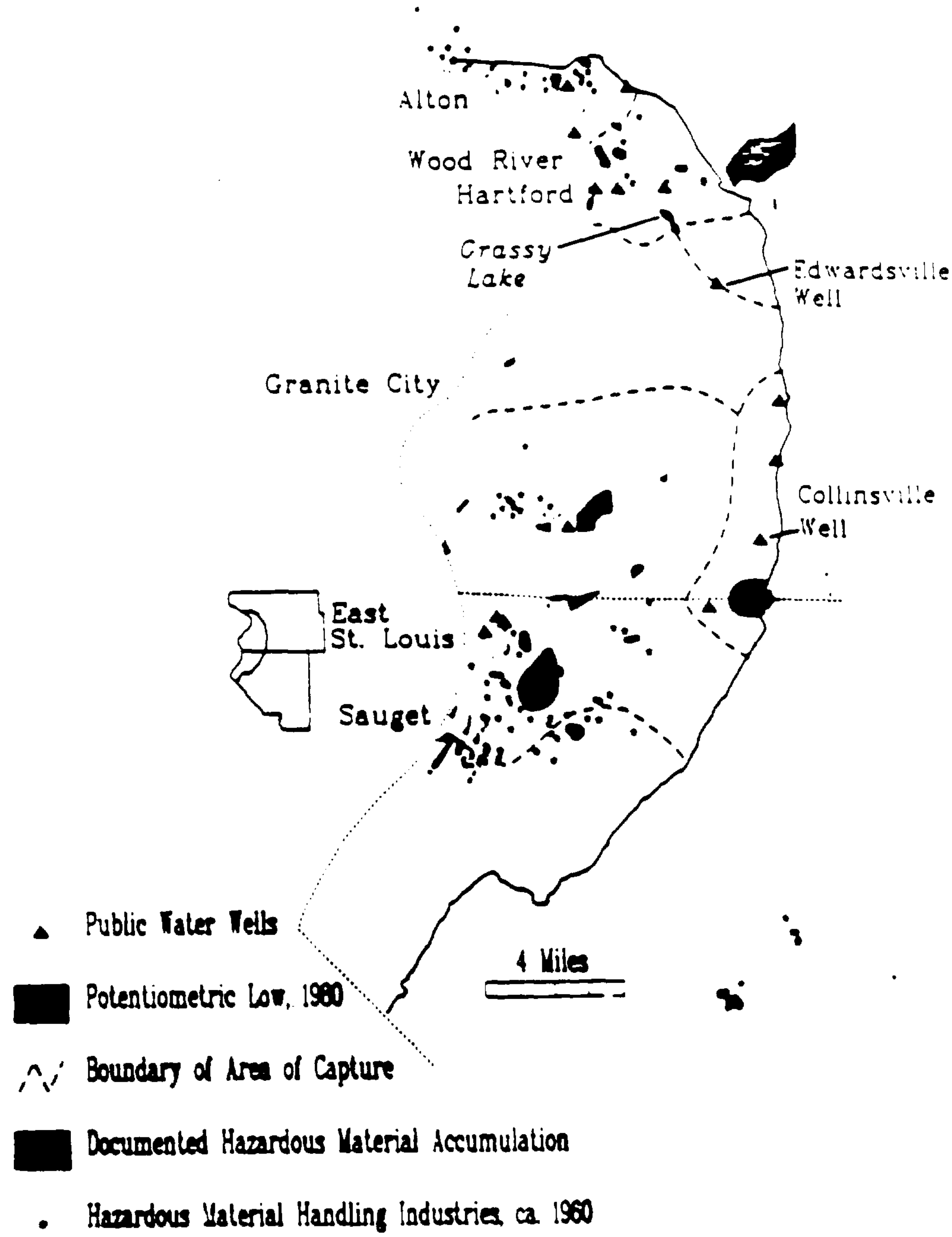

Figure 4.6b. Documented Hazardous Material Disposal Sites 1890-1980 in Relation to Areas of Diversion and Potentiometric Lows 1980 and Public Water Supply Wells. Source: Collins and Richards, 1986.

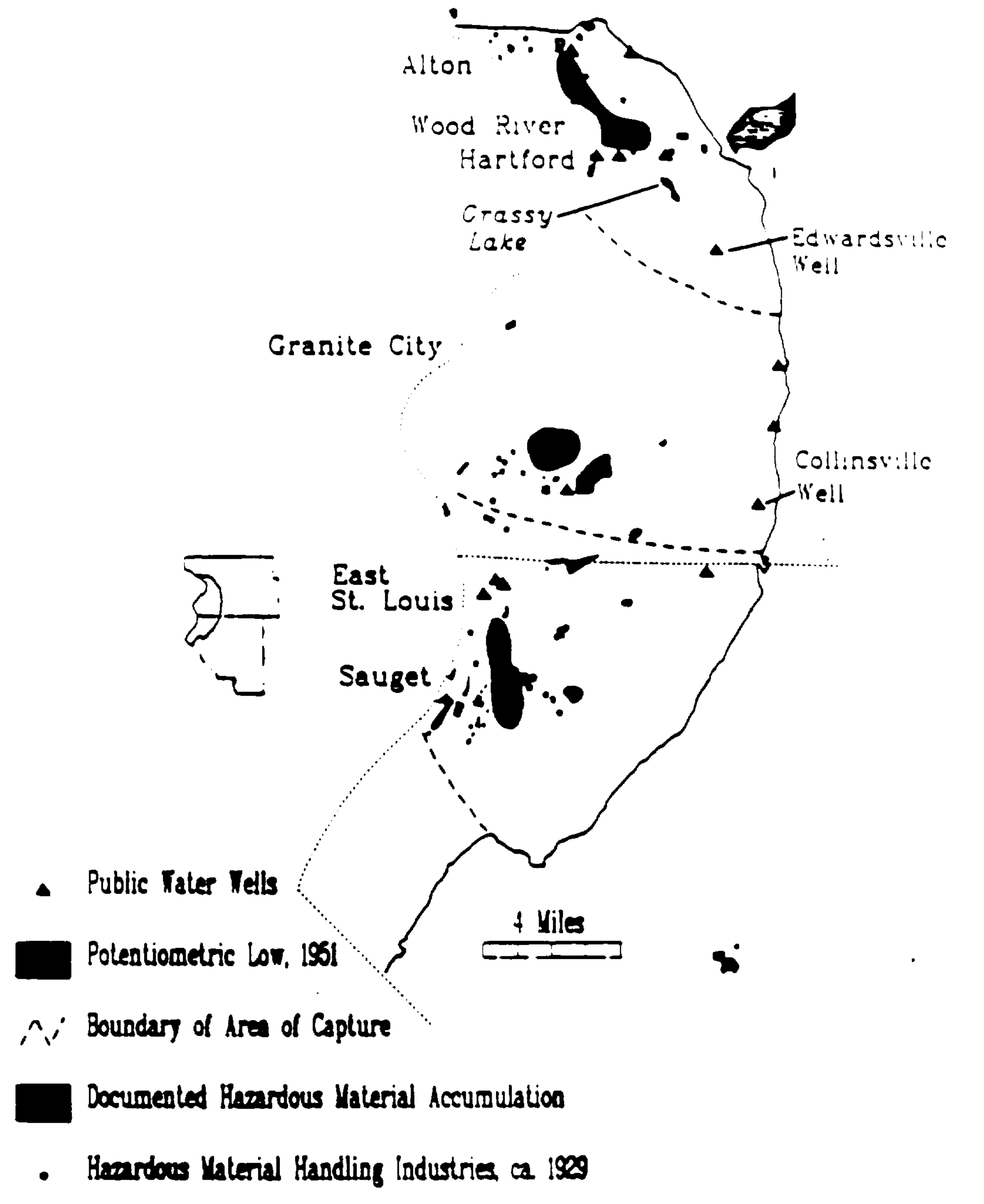

Figure 4.6a. Documented Hazardous Material Disposal Sites 1890-1980 in Relation to Areas of Diversion and Potentiometric Lows 1951 and Public Water Supply Wells. Source: Bruin and Smith, 1953.

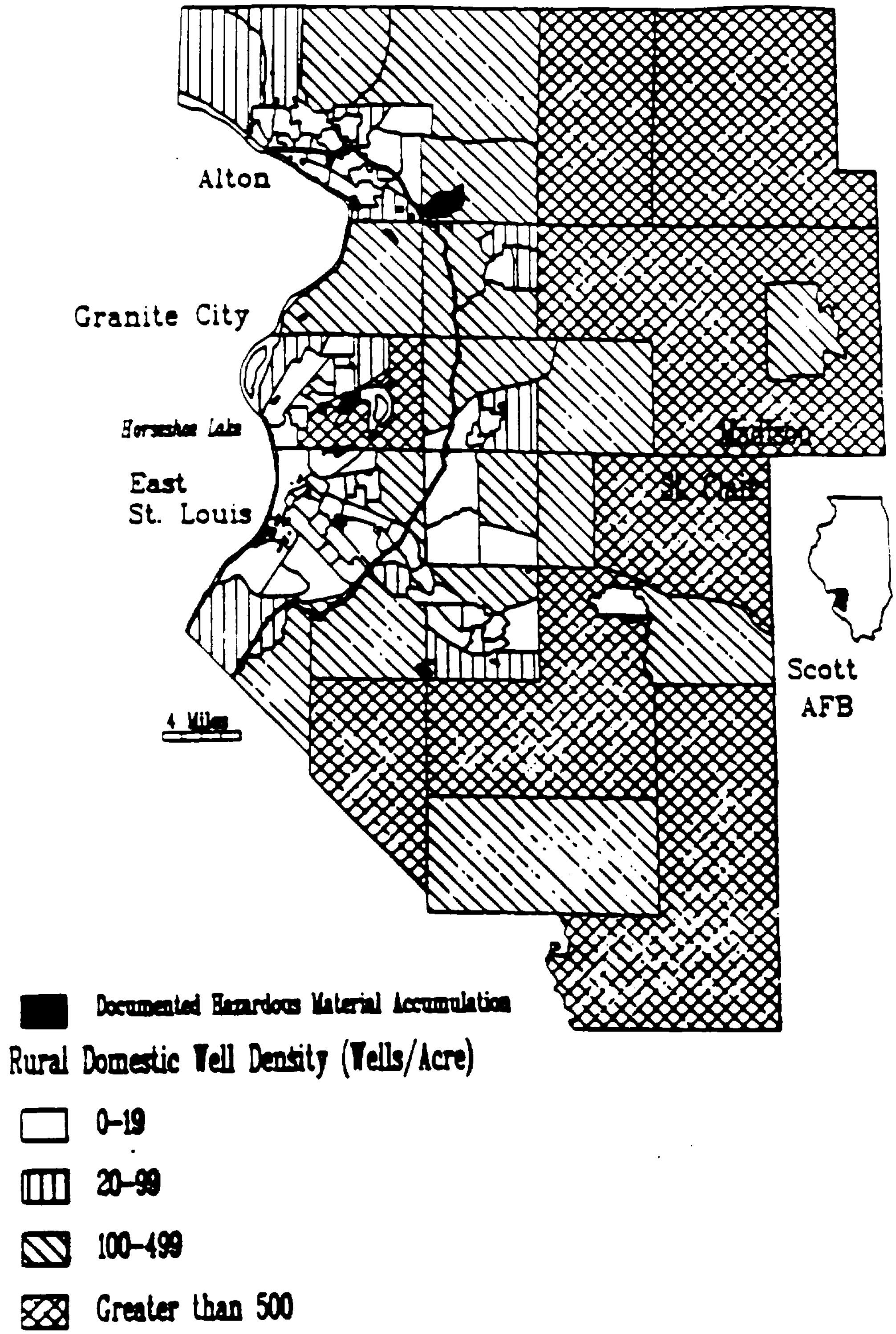

Figure 4.7. Documented Hazardous Material Disposal Areas and Domestic Well Density. Source: U.S. Census, 1980.

Upland communities with wells drilled into the sand and gravel aquifers (Edwardsville and Collinsville) are less likely to have pumped contaminated water in the past. Local ground-water movement has been dominated by the cone of depression created by the industrial districts between the wells near the bluff line and the Mississippi River. A general ground-water movement away from the bluff toward the potentiometric lows would have minimized the possibility that upland residents consumed leachate from documented hazardous material disposal sites in the 1950s and the 1970s (cf. Figs. 4.4, 4.5, and 4.6a, b). Industrial pumpage has declined from more than 70 million gallons a day in 1971 to under 44 million gallons daily in 1980 (Collins and Richards, 1986). If the water consumption of bluff communities increases in the future due to population increases while industrial pumpage declines, diversion of contaminants into municipal wells could occur. For this reason, monitoring of the shallow wells used by upland communities should be initiated.

A comparison of rural domestic wells and documented disposal of hazardous substances indicates that monitoring of domestic wells in the census tract surrounding Horseshoe Lake is advisable, as well as the tract south of Wood River (Fig. 4.7). Several incidents of disposal have been documented in these tracts where there are large numbers of domestic well users. Ground-water monitoring in the vicinity of Scott Air Base should also commence.

The highest population densities in the county are in the urbanized areas and not in the zones with large numbers of domestic well users (cf. Figs. 4.7 and 4.8). Thus, larger numbers of residents can be served by monitoring public water supplies. This does not preclude the need to establish a monitoring system to serve the rural areas.

4.3 Conclusions

In the case of Madison and St. Clair counties, the historical record provides some valuable information about hazardous material management during the past century. While the record is imperfect and incomplete, it complements the data assembled by regulatory agencies (USEPA and IEPA) and suggests that more detailed information is available at the local level. Retrospective analyses of industrial districts can yield substantive information which can be applied to hazards assessment at the local, state, and national level.

Specifically, the information contained in this report provides several insights into waste management within the two-county region. Industrial activity was more widespread in 1929 than in 1980, both in terms of the area devoted to industrial land uses and the number of manufacturing concerns handling hazardous materials. The contraction of industrial activity between 1930 and 1980 removed numerous possible sources of hazardous materials from current inventories, thereby causing the existing databases to underrepresent the number of past sources of hazards. Waste management at these previously undercounted industries was largely absent prior to the 1950s, with a few exceptions. Factories dumped all manner of liquid wastes into water courses for natural purification and dilution treatment, while they heaped solids on site. This created numerous water sinks, including most of the lakes and stream channels on the American Bottoms, where sediments were allowed to accumulate over the years. Factory sites also became repositories of a mixture of hazardous and non-hazardous wastes. In brief, the sites of all former hazardous material handling industries and any abandoned channels or lakes nearby are likely hazardous locations.

From the 1930s on, manufacturers in the two-county area responded to pressure from environmental agencies and gradually added waste treatment facilities. While the addition of waste management equipment may have been slow to occur and in some cases inadequate, it represented moderate efforts to comply with state and federal legislation. Furthermore, on-site treatment facilities were designed to handle the specific effluent of a given industry, thus they provided superior treatment than the sometimes erratic service offered by some of the municipal treatment plants. However, the accumulation of sludges on-site or the transfer of treatment facility wastes to land repositories presents a continuing problem.

In terms of state-wide hazardous waste inventories, this report offers four observations. First, the HWRIC database does not adequately represent the long-term activities of hazardous material-related industries in the Madison-St. Clair county area. Decennial analysis of industrial closures presented patterns resembling those found in the **County Business Patterns**, but the date of inception for many of the large manufacturers fails to account for the complete history of activity in the area. This does not suggest that similar shortcomings exist for other counties--to determine that would require a detailed examination on a county-by-county basis--but it does indicate that the database shares some of the historical weaknesses of its sources. Its utility for analysis of hazards-related activity during the past three decades would be superior to use of the database for long-term retrospective analysis. Second, the Illinois State Geological Survey landfill inventory also presented slight difficulties for use as a historical reference. Two of the major landfills, Bud Brown and Chouteau Island, could not be identified in the current inventory by their former names. Historical information is lacking for many of the landfills, thus decreasing the inventory's utility to cross reference current landfill activity with past owners and events. While not a major flaw, it diminishes the historical usefulness of the database. Third, the identification of a large zone of the American Bottoms as an area requiring high priority ground-water monitoring was supported by the historical information. Although industrial activity in Madison and St. Clair counties has contracted during the past half century, there has been relatively little redevelopment of industrial tracts. Thus, in the case of the American Bottoms, recent information has provided a workable guide to the location of hazardous material sources. Finally, archival sources helped reconstruct the industrial, waste management, and surface alteration histories of the study area. This information can be used to improve the contents of the state-wide inventories, but only through intensive research efforts.

In the context of urban development, Madison and St. Clair counties provide a clear example of the conflicts among political forces, manufacturing interests, and public health authorities. The fragmented political structure of the American Bottoms allowed industries to establish waste management practices which were outlawed in adjoining towns, thereby creating tensions and unsafe health conditions. Continuation of casual disposal practices, fostered by the small community subdivisions, rendered many of the low-lying areas useless as recreational or residential areas.

Manufacturers generally saw their landfilling activity as a useful function. Land which was available for industrial activity in 1890 was generally poorly suited to low-capital investment, such as housing. Manufacturers producing large volumes of solid wastes could economically utilize such tracts of land by filling in depressions on their own property, thereby expanding the area of usable land. Once established, industries exerted a major influence over the local regulation and enforcement of public health issues.

Capital-intensive development was dependent on government-supported improvements, whether river navigation projects or local flood control and sewage treatment. Extensive suburban industrial development required the support of large-scale public works improvements, and the form taken by publicly supported improvements was, to a large measure, shaped by the interests of manufacturers and not by the public health interests of the community.

As in other locales (Rosen 1986), the urbanization of the American Bottoms between 1890 and 1980 showed significant lags between demands for public works and their installation. There was also a delay between the need for improved hazards management and the implementation of such improvements. As a consequence, some accumulations became common-place, self-perpetuating land uses, thereby deferring other forms of development.

4.4 Recommendations

1) The Madison-St. Clair County area is an excellent choice for the implementation of a pilot ground-water monitoring program. This program should be vigorously pursued, particularly in the vicinity of a) pre-1980 landfills which handled mixed hazardous and non-hazardous wastes, b) all former local-gas works, c) abandoned creosote and primary metal processing works, d) public water supply wells drilled into the sand and gravel aquifers beneath the American Bottoms, and e) areas near industries that have practiced on-site disposal.

2) The HWRIC should work closely with existing industries to reduce further accumulations and to provide more detailed documentation of past waste management activity. Attempts should be made to examine the manufacturers' records of past waste disposal and to encourage removal of on-site hazardous material accumulations. Technical assistance should be offered to facilitate waste reduction efforts.

3) Attention should be paid to landfills and abandoned dumps above the major cones of depression. Water tables in these areas are rising, and may continue to rise. This could saturate landfills which are currently above the water table giving the contents unimpeded access to the ground-water system. Older landfills with mixed contents should be examined for possible future saturation.

4) Methods for enhancing the historical utility of the HWRIC-supported databases should be considered.

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AFFIDAVIT OF RUSSELL F. SACKETT

I, RUSSELL F. SACKETT, declare:

1) I am the Plant Manager of the Monsanto Krummrich Plant, located at 500 Monsanto Avenue, Sauget, Illinois.

2) Based on my personal inquiry and knowledge, the number of permanently employed full and part time workers regularly present at the Monsanto Krummrich Plant as of today is 525.

Russell F. Sackett

Russell F. Sackett

City of St. Louis
State of Missouri: ss:

Subscribed and sworn to
before me this 13th day
of September 1996

Karen S. Marschel
Notary Public

KAREN S MARSCHEL
NOTARY PUBLIC STATE OF MISSOURI
ST. LOUIS CITY
MY COMMISSION EXP. MAY 14,2000

M:MHWADE\PRIVATE\MEMO\BJO4.DOC

AFFIDAVIT OF JOSEPH M. GRANA

I, Joseph M. Grana, declare:

1) I am the Manager of Environmental, Energy & Health Services Group of the Cerro Copper Products Co. facility located at 3000 Mississippi Ave, Sauget, Illinois.

2) Based on my personal inquiry and knowledge, the number of permanently employed full and part time employees regularly present at the Cerro Copper Products Co. varies from week to week and month to month as presented by the attached Exhibit A, and from January thru August 1996 has averaged in the range of 869-874 employees. Additional hiring is projected for September, 1996. In addition, there are approximately six (6) contracted food service employees staffing Cerro's cafeteria.

Joseph M. Grana 9-13-96

City of Sauget
State of Illinois : ss:

Subscribed and Sworn to before me this 13th day of September, 1996

Patricia Pourchot
Notary Public

OFFICIAL SEAL
PATRICIA POURCHOT
NOTARY PUBLIC STATE OF ILLINOIS
MY COMMISSION EXP. APR. 26,1998

EXHIBIT A

CERRO COPPER PRODUCTS ESTIMATED EMPLOYEES
1996

	HOURLY	SALARY	TOTAL
JAN	668	215 - 220	883 - 888
FEB	654	215 - 220	869 - 874
MAR	656	215 - 220	871 - 876
APR	656	215 - 220	871 - 876
MAY	650	215 - 220	865 - 870
JUN	648	215 - 220	863 - 868
JUL	647	215 - 220	862 - 867
AUG	654	215 - 220	869 - 874
AVERAGE			869 - 874

09/13/96

Exhibit 7

Cadwalader, Wickersham & Taft

1333 New Hampshire Ave., N.W.

Washington, DC 20036

Telephone: (202) 862-2200

FAX: (202) 862-2400

100 MAIDEN LANE
NEW YORK, NY 10038
TEL: (212) 504-6000
FAX: (212) 504-6666

660 SOUTH FIGUEROA STREET
LOS ANGELES, CA 90017
TEL: (213) 955-4600
FAX: (213) 955-4666

1510 CHARLOTTE PLAZA
CHARLOTTE, NC 28244
TEL: (704) 348-5100
FAX: (704) 348-5200

November 15, 1996

Hon. Carol M. Browner
Administrator
United States Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460

Docket Coordinator
CERCLA Docket Office
Headquarters
United States Environmental Protection Agency
401 M Street, SW (Mail Code 5201G)
Washington, DC 20460

Re: Petition to Rescind the Proposal to List Sauget Area 1 Sites, in Sauget And Cahokia, Illinois, on the CERCLA National Priorities List

Dear Administrator Browner:

Please consider this letter to be a petition to rescind the Environmental Protection Agency's proposal to list the "Sauget Area 1" sites on the National Priorities List ("NPL"), *see* 61 Fed. Reg. 30,575 (June 17, 1996), and additionally, please include this letter in the docket for public comments regarding the listing proposal. As the Agency is fully aware, on Tuesday, November 12, 1996, the United States Court of Appeals for the District of Columbia Circuit held unlawful EPA's use of its Aggregation Policy to list sites on the NPL that would not otherwise meet the criteria for listing. *See Mead Corp. v. EPA*, No. 95-1610, 1996 Westlaw 653637 (D.C. Cir. 1996) (enclosed). This highly significant development is dispositive of the Agency's proposal to list the "Sauget Area 1" sites on the NPL.

Sauget Area 1 consists of nine separate and disparate areas located in Sauget and Cahokia, Illinois. EPA refers to each of the nine areas as "Sources." Pursuant to the

Hazard Ranking System ("HRS"[1]), a site must be scored at 28.50 or higher in order to be proposed for listing on the NPL. In this case, the Agency's conclusion that Sauget Area 1 exceeds the threshold HRS score of 28.50 depends entirely on the Agency's Aggregation Policy. EPA stated in the HRS Documentation Record ("Record") for Sauget Area 1: "The nine sources evaluated were aggregated into one site . . . . [and were] aggregated for HRS scoring."[2] EPA prepared a single HRS scoresheet for the nine aggregated areas purporting to calculate an HRS score of 61.85,[3] and the Record contains no documentation of any individual scores for the nine areas.

Monsanto Company ("Monsanto") submitted comments to the EPA on the proposed listing of Sauget Area 1 by letter dated September 16, 1996. Monsanto's comments discussed at length a number of fundamental errors in the Agency's calculation of the 61.85 score. Among the fundamental errors that were discussed was the erroneous aggregation. Incorporated in Monsanto's comments was a technical report which showed that without aggregation, none of the nine individual areas meet the minimum 28.50 score required for NPL listing. The individual scores for the nine disaggregated sites as calculated by Monsanto range from 0 for "Source 3" to no higher than 8.92 for "Source 2." (See Appendix to this letter.) Monsanto's comments and technical report demonstrated in detail that, scored individually, each of the nine areas had either no, or a very low, level of any risk.

The Court of Appeals' ruling in *Mead Corp.* now makes clear that EPA's decision to list any part of Sauget Area 1 must be based on individual HRS scores for each of the nine individual sites. The court noted that there are only two criteria by which a site can be listed by EPA: the site must have an HRS score of at least 28.50, or the site must be the subject of a health advisory issued by the Agency for Toxic Substances and Disease Registry ("ATSDR").[4] (In addition, each state may designate one highest priority site for inclusion on the NPL.) *Mead Corp.*, 1996 Westlaw at *1. The court flatly rejected EPA's contention that its Aggregation Policy is authorized by CERCLA section 104(d)(4), 42 U.S.C. § 9604(d)(4). *Id.* at *3. For the sake of argument, the court assumed that CERCLA section 105(a)(8)(B), 42 U.S.C. § 9605(a)(8)(B), might be construed to permit aggregating sites on the NPL. However, the court concluded that even under such a construction, each site so aggregated must individually qualify for listing. *Id.* at *4.

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[1] The HRS is set forth in Appendix A to the National Contingency Plan, 40 C.F.R. Part 300.

[2] HRS Documentation Record for Sauget Area 1, at page 16.

[3] HRS Documentation Record for Sauget Area 1, at pages 3-7.

[4] 40 C.F.R. § 300.425(c)(3) To list a site pursuant to an ATSDR health advisory, EPA must also make two determinations: that the release poses a significant threat to public health; and that it will be more cost-effective to use EPA's remedial authority than to use removal authority to respond to the release. *Id.*

As EPA did not determine the individual scores for the nine Sauget Area 1 sites, the Agency has no basis for a listing decision. This means the proposal is fatally flawed and must be terminated. Moreover, Monsanto has shown that none of the Sauget Area 1 sites qualifies for listing in any event. Monsanto has shown that the disaggregated site scores are well below 28.50, and the Record does not contain an ATSDR health advisory for any of the nine sites, or the related determinations required of EPA.

The *Mead Corp.* court stated: "The factors named in the Aggregation Policy bear only the dimmest relation to any idea of risk." *Id.* at *1. That conclusion is poignantly obvious in the case of the Sauget Area 1 sites. Numerous errors stemming from aggregation are detailed in Monsanto's September 16, 1996, letter at pages 30 to 33, and in referenced portions of the incorporated technical report. As the most egregious example, Source 1 is tainted by aggregation with the other sites, even though it has been successfully cleaned up by a $13 million response funded by Monsanto and another company and supervised by the Illinois EPA. Aggregation also taints all of the nine sites with a single, incorrectly scored "observed release" to water in one wetland sample, and taints each of the nine sites with a single incident that was incorrectly scored as an "observed release" to air. Aggregation also led to the absurd result of including in Sauget Area 1 the "tail" of a local creek — an alleged "source" ("Source 3") with no quantifiable waste volume. The result of aggregation is that the potential environmental threats from each of the nine Sauget Area 1 sites was improperly attributed to all the sites, so that nine low threat sites were made to falsely appear as one high threat site.

The *Mead Corp.* Court of Appeals further stated: "This circuit has clearly recognized the harmful effects of being linked to a site placed on the NPL." *Id.* at *3. In light of the court's invalidation of the Aggregation Policy, Monsanto Company respectfully petitions the EPA to rescind its proposal to list the Sauget Area 1 sites on the NPL and to remove the Sauget Area 1 sites from the list of proposed NPL sites.

Sincerely,

James W. Moorman

James W. Moorman
Laurence S. Kirsch
Jonathan R. Stone
Counsel for Monsanto Company

Enclosure

Exhibit 8

CADWALADER

Cadwalader, Wickersham & Taft

1333 New Hampshire Ave., N.W.
Washington, DC 20036
Tel: 202 862-2200
Fax: 202 862-2400

New York
Washington
Los Angeles
Charlotte
London

April 7, 1999

BY FIRST CLASS CERTIFIED MAIL
Docket Coordinator
Headquarters
U.S. Environmental Protection Agency
CERCLA Docket Office (Mail Code 5201G)
401 M Street, S.W.
Washington, D.C. 20460

Re: Supplemental Comments on the Proposed Listing of Sauget Area 1, in Sauget and Cahokia, Illinois, on the CERCLA National Priorities List

Dear Docket Coordinator:

These supplemental comments are submitted by Monsanto Company ("Monsanto") and Solutia Inc. ("Solutia"), Monsanto's attorney-in-fact, in response to the proposal by the United States Environmental Protection Agency ("EPA") to list the "Sauget Area 1" sites on the National Priorities List ("NPL"), *see* 61 Fed. Reg. 30,575 (June 17, 1996), and, in particular, to the additional documents forwarded to us under cover of a letter dated March 8, 1999 from Mr. David Evans, Director, State, Tribal & Site Identification Center, Office of Solid Waste and Emergency Response, EPA.

In the September 16, 1996 comments submitted by Monsanto on the proposed listing of Sauget Area 1 on the NPL ("Monsanto Comments"), which comments Monsanto and Solutia hereby incorporate by reference as if fully set forth herein, we noted various serious data quality deficiencies in the data believed by EPA to support the NPL listing. EPA has now placed additional documents in the administrative record. The documents consist primarily of raw data, with no explanation of their significance.

As a threshold matter, it is arbitrary and capricious and an abuse of discretion for EPA to provide raw data without any explanation of EPA's views of the significance or import of the data, and to request comments on such raw unexplained data. Absent any explanation from EPA, it is not possible to understand EPA's reasoning for or understanding of the data, making it impossible for any other party to provide reasoned comments in response. The public is left to guess what EPA might think the data mean, and EPA is left free to interpret the data after reviewing the public comments. This is truly a situation in which EPA, in the words of the United States Court of Appeals for the District of Columbia Circuit, has unacceptably "cross[ed] the line from the tolerably terse to the intolerably mute." *Tex Tin Corp. v. EPA*, 935 F.2d 1321 (D.C. Cir. 1991) (quoting *Greater Boston Television Corp. v. FCC*, 444 F.2d 841, 852 (D.C. Cir. 1970), *cert. denied*, 403 U.S. 923 (1971)). EPA's failure to articulate the reason for and significance of its actions at such a time that the public has an opportunity to comment on these matters deprives the public of the right to comment to which it is entitled under the Administrative Procedures Act.

It is notable that the sole non-data document included in the new EPA package concedes the correctness of the Monsanto Comments. This sole non-data document is a December 16, 1997 memorandum from EPA's contractor Andrew M. Platt to Jeanne Griffin, EPA Region 5 ("EPA Review Memorandum"). The EPA Review Memorandum divided the issues raised by the Menzie-Cura & Associates, Inc. Data Usability Review ("Data Usability Review") included in the previous Monsanto Comments into three parts or tiers. The EPA Review Memorandum defines the first tier of issues as the "lack of supporting data concerning 'X'-samples." With regard to these issues, the EPA Review Memorandum states that the contractor cannot even evaluate the validity of the comments because "certain missing documentation and preliminary data must be provided."

For example, in the Monsanto comments, Monsanto had noted that the EPA data must be disregarded because of the absence of proper quality assurance/quality control ("QA/QC") data. The EPA Review Memorandum concedes, at 4, that the required "Traffic Report"/Chain of Custody documentation" were missing. The memorandum admits that:

> **[w]ithout this documentation, there is no way to associate the sampling location, the sample number, and verification of the laboratory receipt. In addition, for water samples, there is no other documentation that indicates if the inorganic samples were analyzed for total or dissolved metals.**

EPA Review Memorandum at 4 (bolding in original). The memorandum further states:

> The statements that appear on all Inorganic CLP cover sheets affirming that the raw data were subjected to background correction, and that these corrections were applied before generation of analytical Results *were not addressed, and the form was not signed*. It is an extremely unusual event to receive an inorganic data package with these questions unanswered (this is the first in thousands of such Cover Sheets that this reviewer

> and his associates have seen without an appropriate response.

Id. (emphasis in original).

Monsanto's previous comments noted the glaring absence of "any of the supporting laboratory data needed for QA/QC validation." Comments at 14. The EPA Review Memorandum agrees, noting the absence of required Data Reporting Forms, and the lack of raw data. The Memorandum acknowledges that "Raw Data **are of fundamental importance**." *Id.* (bolding in original). The Memorandum further concedes that, with regard to certain items relied upon by EPA, "without the raw data, these are unverifiable and are not scientifically reconstructible by an outside source." *Id.* The Memorandum then goes on to list *twenty-three* different types of data that were missing and should be supplied. EPA Review Memorandum, at 5.

With regard to the organic data, the EPA Review Memorandum acknowledges yet additional data gaps, including missing "Traffic Report"/Chain of Custody Documentation; Data Reporting Forms; data on quantitation of Aroclor peaks; data concerning specific peaks used to determine Aroclor Calibration Factors; the number and retention time of peaks quantitated in samples; and raw data (listing *twenty-five* different types of missing information). *See* EPA Review Memorandum, at 6.

It is not known whether EPA believes that the data submitted along with the EPA Review Memorandum fill the information gaps that EPA now acknowledges to have been present all along. Monsanto and Solutia note, however, among other problems, that certain of the required information are still missing, including chromatographs for the PCB Aroclors. In addition, several "SQLs" (sample quantitation limits) for metals noted as issues in the previous comments still cannot be confirmed with the information included in the new EPA data. There may be other omissions and problems with these new data, but EPA's failure to explain its understanding of their significance has made it impossible for Monsanto and Solutia to provide meaningful comments at the present time. Monsanto and Solutia therefore respectfully reserve the right to submit further comments on these data.

It is also Monsanto's and Solutia's understanding from the EPA Review Memorandum that EPA plans to supplement the record further with regard to the "second tier" issues (issues that "reflect[] specific technical criticism with the use of particular soil and sediment samples . . . used to verify the chemical composition of the Sauget Sites") and "third tier" issues (issues concerning data usability) and that the additional data submitted up to the present time do not address either of these types of issues. Therefore, Monsanto and Solutia respectfully reserve the right to comment on all tiers of data issues at such time as the remaining issues are addressed.

Finally, Monsanto and Solutia note that EPA's failure to provide the necessary data along with the initial listing package has prejudiced and continues to prejudice Monsanto and Solutia by requiring the expenditure of additional resources for commenting and responding to data gaps that, in the eyes of EPA's own reviewers, were transparent and serious. EPA's failure to include these data initially render the Sauget listing proposal arbitrary and capricious and an abuse of discretion.

For all of the reasons specified above and in the Monsanto Comments, the listing of Sauget Area 1 on the NPL would be arbitrary and capricious and an abuse of discretion. Monsanto and Solutia therefore request that EPA not finalize the NPL proposal of Sauget Area 1 and that EPA remove Sauget Area 1 from the list of proposed NPL sites and from any further consideration for listing

Sincerely,

James W Moorman

James W. Moorman
Laurence S. Kirsch
Jonathan R. Stone
Counsel to Monsanto Company and Solutia Inc.

Exhibit 9

COPY

Office of the Mayor

November 28, 2001

Christie Todd Whitman
Administrator USEPA
Ariel Rios Building
1200 Pennsylvania Avenue
Washington, DC. 20460

Dear Administrator Whitman,

I am most concerned about the *proposed* listing of the Sauget Area I and 2 as potential Superfund Sites.

I am sure you are well aware that the remediation/clean up of "Dead Creek" is almost complete. I am told that the exposure potential will shortly be non-existent. I am also told that the toxicity risk will also be absent.

All remediation work has been done by Solutia over the past three years, under the full oversight and approval of the U.S.E.P.A.

I am truly concerned about the economic impact this potential listing could have on our Cahokia community.

Please find attached a letter sent today to the Docket Coordinator of the U.S.E.P.A.

Would you be so kind as to make any suggestions of how I can further express my concerns about this proposed listing?

Sincerely,

Denita Reed

Denita Reed
Mayor

DR:lls

Village of Cahokia 103 Main Street Cahokia, Illinois 62206-1819
Office 618-337-9500 Fax 618-337-9529

COPY

Office of the Mayor

November 29, 2001

Docket Coordinator, Headquarters
U. S. Environmental Protection Agency
CERCLA Docket Office
1235 Jefferson Davis Highway
Crystal Gateway #1, First Floor
Arlington, VA 22202

RE: Comments of the Village of Cahokia, Illinois Regarding the Proposed Listing of the Sauget Area 1 and 2 Superfund Sites

These comments are respectfully submitted by the Village of Cahokia, Illinois in response to the proposal by the United States Environmental Protection Agency ("EPA") to list the "Sauget Area 1" and "Sauget Area 2" sites on the National Priorities List ("NPL"). See 66 Fed. Reg. 47612 (September 13, 2001). Both of these sites are located in part in the Village of Cahokia, Illinois.

The Sauget Area 1 sites include portions of Dead Creek and a borrow pit/wetlands area just south east of the Cahokia Village Hall. The southern tip of the Sauget Area 2 Sites is located in Cahokia.

SAUGET AREA 1 SITES

In 1996, when the EPA proposed Sauget Area 1 for listing, the Village of Cahokia approved of the listing because at that point in time, contamination in the Village, which had been known to be there for many years, was not being addressed. Based on statements of the EPA, we understand that many of the industries and businesses located near or on Dead Creek, discharged their wastes directly into the Creek beginning in the early 1900's when such discharges were not considered to be a problem. The potential problems that the creek presented because of these discharges became known in the late 1970's. The Village has attempted numerous times over the years to get the government to address the problems of the creek, but to no avail. Even after the 1996 proposed listing, several years passed before any activity to actually address the creek began.

Then, in 1999 the Village began to see progress, EPA asked Solutia to undertake a large study of the Sauget Area 1 Sites to determine the actual extent of contamination in our community from Dead Creek. Solutia agreed to undertake and finance this work. Solutia representatives were most present in the community: sampling the creek, nearby yards and wetlands. The community was kept well informed by Solutia through town hall meetings, press releases and newsletters.

In 2000, Solutia agreed with EPA to undertake the actual work to get the sediments out of the creek, despite the fact that the study of Area 1 Sites was not complete. Since then, we have seen pipes go in along the creek and finally, this summer, sediment removal taking place. We understand that the work that has been done, with USEPA oversight/approval, is due to be complete by summer of 2002.

Based on the information we have received from EPA, the Solutia study determined that the residential properties along the creek were not contaminated from the creek sediment. We also understand that once the creek sediment is removed the risk of exposure from the Area 1 sites within Cahokia will have been substantially reduced or eliminated from our community. No additional, unacceptable residential risks have been identified in the recent Human Health Risk Assessment for Area 1.

We have been anxiously awaiting the removal of all the creek sediment so that new plans for area redevelopment can be facilitated. The cleanup is near an end, and we are excited about the redevelopment potential. To learn now that an NPL listing is proposed for Area 1, including segments of Dead Creek already cleaned or near to being completed, is both confusing and upsetting.

As the new mayor for the Village of Cahokia for the past several months, I am earnestly working with community business leaders, area legislators and our village population on four major projects in our community. All of the projects are in planning stages with early 2002 initiation dates. All of the projects are certain to have a most positive impact on this historic community (established in 1699) which is so in need of an economic revival.

I am genuinely concerned for the negative impacts that the NPL listing could have on this community. It is clear to us that the listing will put potential investors on notice that EPA thinks the Area 1 Sites are among the worst environmental problems in the country and that they need further action. This listing will only result in investors, redevelopers and homebuyers looking elsewhere from the Cahokia area for their home and business needs. EPA cannot dispute that NPL listings have a negative impact on communities from a redevelopment perspective. Despite this, the agency is trying to list our community, when none of its stated purposes are met. We ask that the agency seriously reconsider the impact its listing of Area 1 will have on the Village of Cahokia for the portion of Area 1 that falls within the boundary of the village. We request that the EPA consider redefining Area 1 to exclude the segments of the creek and other sites that fall within the boundary of Cahokia. The Village of Cahokia fails to see the purpose of the proposed listing at this point in time. While such a listing may be needed for the remaining sites in Sauget, the Cahokia portion of Area 1 clearly no longer requires such a designation, in our opinion and in the opinion of independent environmental consultants. There is a cost for this kind of listing, without any commensurate benefits. It is our understanding that parties who are potentially responsible for the contamination have already been notified and are well aware of the status of both the sites.

I might add that I am truly dismayed as the Mayor of the Village of Cahokia that I was not officially informed of the proposed listing, which I have since discovered was listed on the Federal Register: September 13, 2001.

I would hope that this urgent letter would serve and be accepted as official comment, even though I was informed by USEPA on November 13th that the deadline for the NPL comment period was on November 13th.

Respectfully submitted,

Denita Reed

Denita Reed
Mayor

DR:lls

c: Christie Todd Whitman, Administrator USEPA
David A. Ullrich, Deputy Regional Administrator USEPA
William Muno, Director Superfund Division – S-6J
Renee Cipriano, Director IEPA
Governor George H. Ryan
U.S. Senator Richard J. Durbin
U.S. Senator Peter G. Fitzgerald
U.S. Representative Jerry Costello
State Senator James F. Clayborne, Jr.
State Senator Dave Luechtefeld
State Representative Wyvetter Younge
State Representative Dan Reitz

Exhibit 10

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

RECEIVED AUG 3 0 2001

REPLY TO THE ATTENTION OF

Statement
By the
United States Environmental Protection Agency
Region 5

REGARDING RESIDENTIAL SOIL SAMPLING IN THE REGION KNOWN AS SAUGET AREA 1, LOCATED IN SAUGET AND CAHOKIA, ILLINOIS

In January 1999, the United States Environmental Protection Agency (USEPA) and Solutia Inc. agreed, through an Administrative Order on Consent, that the company would investigate whether the historical disposal of hazardous substances in and around Dead Creek (a drainage channel running through Cahokia and Sauget, Illinois) posed environmental or health risks to the community. USEPA approved Solutia's proposed plan for sampling the soils in this area to best determine the impact, if any, on residential properties surrounding the creek in a study area bordered by Falling Springs Road, Route 3, Judith Lane and Route 157.

In addition to extensive soil sampling in Dead Creek itself, sampling took place on residential properties most likely to have been impacted by the creek. Dead Creek was found to contain contamination at levels which require remedial response. This response, in the form of a creek sediment dredging and disposal project, is currently underway. The results of this residential soil sampling, however, showed no risk to human health or the environment from within the study area, as only low levels of some contaminants were found. At this time, USEPA believes, based on these samples and results, that there is no need to conduct any remedial action on residential soils in the study area bordering Dead Creek.

Michael McAteer
Remedial Project Manager
U.S. EPA

Exhibit 11


Granite City
Madison
Venice
Brooklyn
National Stock Yards
East St. Louis
Lansdowne Heights
French Village
Edgemont
Centerville
Cahokia
Stolle
Horseshoe Lake
Blue Hill
Ogles
Caron

K -

Exhibit 12


REF 32

Exhibit 13

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

File

217/782-3392

January 6, 1994

Refer to: L1630200005 -- St. Clair County
Sauget Sites (Area 1) -- Sauget
Superfund/Compliance

Mr. Paul Sauget, Mayor
Village of Sauget
2897 Falling Springs Road
Sauget, Illinois 62206

Dear Mr. Sauget:

Thank you for your letter dated November 17, 1993 concerning the recent flooding at Dead Creek.

IEPA sampled the surface water in Dead Creek beginning in late September of this year. This sampling event was in response to concerned residents of Cahokia as well as concerns expressed by both you and Mayor King of Cahokia. Our samples indicated that contaminants present in the water do not pose an immediate threat to residents living near the creek, but that the levels of iron and lead in creek water are above the State's water quality standards for those compounds. More recent sampling results have shown that in addition to these compounds, phenolics are now also above state standards. The origin of these phenolics in the creek water can be attributed to the landfill just west of Dead Creek along Queeny Avenue. As these three compounds are above state water quality standards, it is IEPA's interpretation that concentrations of these compounds can be hazardous to aquatic life in the creek.

In addition to this surface water sampling, both IEPA and Monsanto Company have conducted sediment and soil sampling in Dead Creek. The segment of Dead Creek that is fenced from Judith Lane to Queeny Avenue was found to contain very high levels of polychlorinated biphenyls (PCBs) in creek sediments.

IEPA has no formal record of how the culvert beneath Judith Lane came to be blocked. In addition, it is not presently clear what governmental unit or private party actually ordered or carried out this blocking action. This Agency agrees, nevertheless that the blockage of the culvert has effectively prevented the spread of contaminated sediment within Dead Creek south of Judith. Given the fact that PCB concentrations in creek sediments are considerably higher north of Judith makes the action seem prudent today.

CER 124889

It is IEPA's position that the removal of this blockage would cause the migration of PCB-contaminated sediments from the fenced portions of Dead Creek to residential areas of Cahokia, thereby creating a potentially serious health problem. We agree that something needs to be done about the flooding; however, your proposal that the culvert be unblocked does not appear to be a viable option given the water and sediment sample results from Dead Creek.

Recent sampling results indicate that the stormwater in the creek would have to undergo treatment before it is discharged. The most logical solution would be to have the stormwaters from the fenced portions of Dead Creek pumped to the American Bottoms Wastewater Treatment Plant for treatment. A request will be made for USEPA to fund this project since State funding is not available. USEPA will perform cost recovery on potentially responsible parties or PRPs (current and former landowners, transporters and generators, etc.) it identifies as having association with discharges to Dead Creek to recover its costs. In addition, it is probable that PRPs associated with the landfill on Queeny Road to the west of the creek would be sought, since that landfill is responsible for many of the contaminants that have appeared in the surface waters of Dead Creek between Judith Lane and Queeny Avenue.

Sincerely,

Mary A. Gade

Mary A. Gade
Director

cc: Mayor King, Cahokia

bcc: Paul Takacs
Division File

CER 124890

Exhibit 14

L1630200005 - St. Clair
Sauget Sites (Area 1) - Sauget
Superfund Tech Reports

MEMORANDUM

Date: January 20, 1994

From: Paul E. Takács, IEPA

To: Regional Decision Team

Subject: Sauget Sites Area 1 Sites -- Briefing Memorandum

This purpose of this memorandum is to familiarize the Regional Decision Team with the Sauget Area 1 Sites and to provide a set of proposed measures that need to be taken at this site.

This memorandum could not have been provided without the assistance of the SACM team members. Besides myself, this team consists of Sam Borries, Thomas Martin, Alan Altur, Sally Jansen, Jeff Gore and Susan Pastor.

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

BRIEFING MEMORANDUM - SAUGET AREA 1 SITES
PROPOSED NPL SITE
SAUGET AND CAHOKIA, ILLINOIS

The purpose of this memorandum is to brief the Regional Decision Team on the background and current status of the Sauget Area 1 Sites. The Illinois Environmental Protection Agency (IEPA) has met with representatives of USEPA in regards to proposed immediate measures which need to be taken at these sites. This memorandum will provide a detailed description of these and other actions which must be considered at the Sauget Area 1 Sites.

I. Background

One of the most highly contaminated areas in Illinois are the Sauget Area 1 Sites. They comprise three hazardous waste disposal landfills, a formerly used waste impoundment, two abandoned gravel pits and five intermittent segments of Dead Creek. These sites had allegedly received hazardous materials/wastes from local industries that became established in this vicinity around the turn of the century. The primary disposal methods included direct industrial wastewater discharges into the five identified segments of Dead Creek, and controlled/uncontrolled disposal at the other six sites. The contaminants found at the Sauget Area 1 Sites consist mainly of chlorobenzenes, chlorophenols, chloroanilines, nitrophenols, nitroanilines, naphthalene, PCBs and PNAs. These sites were aggregated together on the basis of their relative proximity to each other, shared watershed, nearly identical contaminants, and a common property owner at many of the sites during the periods of disposal. Provided below is a brief description of each site:

Site G

A former surface/subsurface hazardous waste disposal site which was originally used as a gravel pit. Site G occupies about 4.5 acres and is littered with demolition debris, metal wastes and corroded drums. Oily and tar-like wastes are found mainly in areas where drums are present; however, most of the landfill is only partially covered with fly ash and cinders. IEPA estimates that there is approximately 22,000 yd^3 of contaminated fill and about 60,000 yd^3 of saturated chemical waste materials. Surface soil sampling revealed PCBs (74,000ppm total), 1,4-dichlorobenzene (22,000ppm), PCP (21,000ppm), 4-nitrophenol (1000ppm), 2-nitroaniline (220ppm), and PNAs. The primary contaminants detected in subsurface soils included naphthalene (5,429ppm), PCP (4,769ppm) and 4-chloroaniline (231ppm). Access to the site is restricted by a chain-link fence installed by USEPA. Aerial photos show major disposal activities occurring at Site G from the early to mid-1950s to the mid-1960s, after which sporadic disposal occurred until it was fenced in 1982.

Site H/I

Both Site H and Site I are former gravel pits with only portions of Site I filled with chemical wastes. Site H is about 5 acres and is completely covered with fly ash and cinders while Site I, having the same cover materials and being completely covered, is approximately 55 acres. Aerial photos indicate that waste disposal at these sites began prior to 1937 and continued until the mid- to late-1950s. IEPA estimates the volume of fill material to be about 116,000 yd^3 and saturated chemical waste material about 250,000 yd^3. Predominant contaminants found at Site H included dichlorobenzenes (50,242ppm total), 1,2,4-trichlorobenzene (7,581ppm), naphthalene (2,265ppm), 4-nitroaniline (1,834ppm), PCBs (1,800ppm) and PNAs. Site I had similar contaminants but at lower concentrations with the exception of 1,2,4-trichlorobenzene (8,225ppm) and cyanide (3,183ppm). Access to Site H is completely unrestricted, however waste materials are not present at the surface as they are at Site G. Access at Site I is restricted by a chain-link fence and a 24 hour guard at both entrances to the business which owns the site.

Site L

This site is the location of a former surface impoundment used by a local hazardous waste hauling firm. It is approximately 70 feet by 150 feet and about 8 feet deep. The site is mostly covered with cinders and access is not restricted. The main contaminants at Site L consist of PCBs (500ppm), 4-chloroaniline (270ppm) and PNAs.

Site M

Site M is a formerly used gravel pit that was excavated sometime in the 1940s. IEPA is not aware of any active waste disposal at this site. However, given Site M's location near Dead Creek and the fact that the bottom elevation of the pit is lower than that of the creek, most of the contamination at this site can be attributed to creek sediment being passively transported from Dead Creek. The principle contaminants at Site M included PCBs (505ppm total) and dichlorobenzenes (66ppm total). The Monsanto Company has performed most of investigatory work at this site. Monsanto determined that the volume of sediment from Dead Creek migrating into Site M is on the order of 3,600 yd^3. Access to this site is restricted by a chain-link fence installed by USEPA in 1982. The probability that persons could come into contact with PCB-contaminated sediments is low considering the contaminated sediment is always under water.

Site N

Another site located next to Dead Creek, Site N was a 10-foot deep excavation owned and operated by a construction company. The site was evidently used for the disposal of construction and demolition debris. Two soil borings have shown PNA contamination, however the main group of chemicals found at other Area 1 sites were not found at Site N. Access at Site N is restricted by a chain-link fence.

Dead Creek Segment A

Located next to Site I, this portion of Dead Creek is owned by Cerro Copper Products, Inc. As the culvert at the south end of Dead Creek Segment A (CS-A) had been blocked, this site behaved as an impoundment. It was used as a surcharge basin for the Village of Sauget sewer system during storm events. Given that most of the users in the system were industries, this site received a large volume of industrial process wastewater. Many of the contaminants found at this site were of the same nature as those found at other Sauget Area 1 Sites. As part of a consent decree with the State of Illinois, Cerro Copper agreed to remove approximately 25,000 yd^3 of contaminated creek sediment from CS-A in 1990 at the cost of over $13.6 million. Work was performed under IEPA oversight and CS-A was backfilled and regraded after the removal was complete. A vapor barrier was placed beneath the final regrade to inhibit volatilized compounds coming from groundwater flowing through Site I.

Dead Creek Segment B

As in the case with the above site, the culvert at the south end of Dead Creek Segment B (CS-B) was sealed, also causing this site to behave as an impoundment. CS-B received the same wastewater flows from the Sauget industries prior to the sealing of the culvert at the south end of CS-A. CS-B also received direct wastewater flows from a rubber recycling operation, the hazardous waste hauling firm that operated at Site L and from overflows from Site L when it was in use. CS-B also receives surface runoff from Site G. The main contaminants found in sediments at this site include PCBs (546ppm total), dichlorobenzenes (237ppm total) and minor amounts of PNAs, naphthalene and chlorobenzenes. Access to this site was restricted by a chain-link fence installed by USEPA. Additional sediment sampling by the Monsanto Company has further verified that creek sediments have been impacted by PCBs. Sampling by IEPA has shown that surface water in CS-B is affected by contaminants from Site G.

Dead Creek Segments C, D, E

These segments of Dead Creek received the same industrial flows from the Sauget industries and sources mentioned above prior to the culverts being blocked at CS-A and CS-B. Because these blocking actions had occurred long ago, many of the contaminants which IEPA suspects should be present have since volatilized. Presently, the main contaminants of concern in these creek segments are PCBs. Very limited sampling has revealed total PCB concentrations of up to 60ppm. These segments of Dead Creek run through residential areas of Cahokia and access to them is completely unrestricted.

Work by IEPA to determine the magnitude and extent of contamination at all of these sites has been ongoing since 1980. Funding for these investigations was provided by state funds at the cost of over $1.3 million. To date, these actions represent the State of Illinois' most costliest efforts to enter any site onto the NPL.

II. Current Status

IEPA is not aware of recent disposal activities at any of the Sauget Area 1 Sites. Currently, the most significant problem associated with these sites is the flooding at Dead Creek and high water table conditions that remain. Prolonged precipitation events within the Mississippi River floodplain have caused the water table at the Sauget Area 1 Sites to rise within three feet of the ground surface, and in many cases above the ground surface. After heavy periods of rainfall, Dead Creek's capacity to absorb stormwater is greatly decreased. As the culvert at the south end of CS-B has been sealed, flooding has occurred on Judith Avenue (south of CS-B) and has backed up to Queeny Avenue (north of CS-B) thereby creating serious community concerns. As surface water rises in the CS-B "impoundment", it comes into contact with surfical contamination at Site G. It is clear that Site G is affecting surface water quality in the creek (e.g., significant levels of phenol, chlorobenzenes, chlorophenols, and chloroaniline). Furthermore, these contaminant levels in surface water have been increasing to the point that they are now above the State of Illinois' water quality standards.

IEPA is intent on placing the Sauget Area 1 Sites on the NPL. Comments on the draft scoring package had been sent to USEPA on December 1, 1993. We anticipate that the scoring package can be finalized shortly so that these sites are eligible for the Spring of 1994 proposed listing update.

III. Proposed Immediate Measures

IEPA has reviewed all available data relative to the Sauget Area 1 Sites. Our recommendations on immediate measures are listed below:

1. Repair or fortify the fences that were installed around Site G, CS-B and Site M to minimize the risk of persons coming into contact with these sites. There is an access point to the southern portion of CS-B that needs to be blocked.

2. Perform additional air sampling at Site G to better characterize airborne contaminants leaving the site. If the sampling indicates potential exposures that could lead to acute health problems, the feasibility of a surface removal/capping action at this site will be evaluated.

3. Fully characterize the extent of contamination in the unfenced portions of Dead Creek (CS-C, CS-D, CS-E). As very limited data suggest, known concentrations of PCBs (60ppm total), while significant, would not be expected to result in <u>acute</u> health problems for children playing in creek sediments. IEPA recommends that fencing be constructed around creek segments showing PCB concentrations that could cause acute health problems if full-scale remedial activities (e.g., removal actions) are not expected to be completed within the next few years.

4. Eliminate the flooding at CS-B. IEPA proposes that this segment of Dead Creek be pumped out so that the water level in CS-B does not rise to the extent that it comes into contact with Site G. Recent field observations have indicated that waters within CS-B have been impacted by Site G and that these waters are migrating outside of fenced areas into neighborhoods. IEPA's interpretation of the surface water sample results suggest that while there are no acute health effects associated with a possible brief dermal exposure to surface water flooding from CS-B, there will likely be ecological effects as the contaminant levels are above state water quality standards. IEPA proposes (since contaminant levels are above water quality standards) that the water be pumped to the nearby wastewater treatment plant for treatment. As these flooding problems are likely to prevail through 1994, this pumping action could possibly be a long-term project.

5. IEPA has already identified approximately 30 potential PRPs at the Sauget Area 1 Sites in a past enforcement action. The goal of this action was to solicit a settlement for local industries to perform a Sauget Area 1 RI/FS without having to resort to naming the site to the NPL. Viable parties are among these potential PRPs. A thorough PRP search must be performed and additional information needs to be obtained from further Section 104(e) Information Requests to these and other potential PRPs. In addition to this PRP information, IEPA also has limited information on waste disposal activities at these sites from interviews of longtime residents.

IV. Recommended Measures

IEPA recommends that a very strong enforcement approach be employed at the start of the project. We would anticipate that Section 104(e) Information Requests be sent (at minimum) to potential PRPs that IEPA had identified in the earlier state enforcement action. It is further recommended that the questions in the Request be more specifically worded than the questions that are in USEPA's model 104(e) Request. IEPA anticipates that the first round of 104(e) Requests could be mailed out by mid-February, 1994.

While these and further rounds of Requests are being evaluated by the potential PRPs, a very thorough PRP search must be conducted. Information obtained in the PRP search and 104(e) Request responses will be used to build an enforcement case against identified PRPs. Given that these activities may take as long as six months, we anticipate that negotiations with the PRPs could begin by August 15, 1994. A sixty day negotiation period with the PRPs would then take place after which a settlement will or will not be reached.

If a settlement with the PRPs cannot be reached by October 15, 1994, IEPA recommends that an RI be performed to supplement IEPA's existing site database. More specifically, the fieldwork in this

RI would entail performing confirmatory borings at each of the sites to complete a source area characterization, the investigatory work mentioned in III.2 and III.3, a groundwater study, a risk assessment and an ecological assessment. IEPA anticipates that the RI report could be completed by the end of 1995 at the cost of $1.5 to $2 million.

Because of extensive historical involvement IEPA believes that, at minimum, the RI should be performed as a state-lead action. In addition to having obtained most of the existing data at all Sauget Area 1 Sites, IEPA has developed extensive community relations contacts in Cahokia and has had reasonably good relations with many of the Sauget industries.

With respect to IEPA's earlier attempts to reach a settlement with the local PRPs for an RI/FS, it was very much apparent that documentation concerning disposal activities was lacking. Given this lack of documentation, the time period during which these activities existed, and the extreme unwillingness for these potential PRPs to cooperate, it is likely that the RI (and FS) will be performed as fund-lead actions. IEPA would be willing to accept the lead role in enforcement for the Sauget Area 1 Sites in order to reach a settlement with the PRPs.

Exhibit 15

Illinois Environmental Protection Agency · 2200 Churchill Road, Springfield, IL 62706

MEMORANDUM

L163 0200005 - St. Clair
Cahokia/Dead Creek
Superfund/Gen. Corresp

DATE: March 22, 1985

TO: Richard Carlson

FROM: Bob Kuykendall BK

SUBJECT: Dead Creek

This memorandum serves to provide you with some specific information which may, at your discretion, be communicated to the Governor's office. The reason for this is the continuing sensitive issue of Cahokia Mayor King's understanding of project completion based upon the Governor's comments last year.

1. IEPA bid a limited clean-up project for the northwest portion of Dead Creek on November 15, 1984. The Presidents of Cahokia and Sauget were advised of this.

2. Bids were received November 27, 1985 by letter.

3. A contractor was selected and a contract was negotiated, but not signed on December 5, 1985.

4. On December 6, 1985, IEPA became aware of information which caused reconsideration of safety aspects of the proposed clean-up. The clean-up action was held.

5. Throughout January, IEPA ran advertisements requesting Statements of Qualifications (SOQ's) from firms interested in performing a Remedial Investigation/Feasibility Study (RI/FS) at the site.

6. The deadline for submittal of SOQ's was February 19, 1985.

7. IEPA is in the process of selecting four finalists to receive formal Requests for Proposal (similar to invitation to bid).

8. IEPA anticipates final procurement activities to occur in May, 1985 and initiation of RI/FS work in June, 1985.

9. The RI/FS is expected to require about 18 months for completion.

10. A letter restating these facts has been drafted for the Village Presidents and copies are attached.

SKD:ba/0574e/6

Attachment

Note: Also attached is an inquiry from the Governor's office and my response.

J013727

Exhibit 16

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF ILLINOIS

CERRO COPPER PRODUCTS CO., Plaintiff,	)	
vs.	)	No. 92-CV-204-PER
MONSANTO COMPANY, Defendant.	)	

DEPOSITION OF ALLYN KONRAD

Taken on behalf of Defendant
March 14, 1995

William L. DeVries, CSR
CSR NUMBER: 084-003893

POHLMAN & MORRIS REPORTING COMPANY

Q. And the statements you made concerning the search for documents that was done or was supervised by Mr. Larem and yourself, did those statements also apply to Rogers Cartage's search for the documents described in this subpoena?

A. Yes, they do.

Q. Could you generally describe for me the business of Rogers Cartage?

A. We are a common in contract carrier. We haul liquid chemicals. Basically I think we have 48 state authorities and Canadian authority.

Q. How long has Rogers Cartage been in business, do you know?

A. I really don't know for sure.

Q. Do you know how long Rogers Cartage has done business at the 2900 Falling Springs Road address?

A. I do not know an exact date. I can give you an approximate. Basically it was 1970.

Q. Did that location replace a prior location in that area?

A. Yes.

Q. Where was the prior location?

A. The prior location was I would say approximately three miles away in the city of Cahokia, Illinois.

Q. Do you know what the address of that location was?

A. No, I don't.

Q. Do you know whether as a common carrier Rogers Cartage does business pursuant to tariffs filed with the Interstate Commerce Commission?

A. Yes, they do.

Q. Does Rogers Cartage also file tariffs with the Illinois Commerce Commission?

A. Yes, they do.

Q. Does Rogers Cartage carry anything other than liquid chemicals?

A. Not that I'm aware of.

Q. To your knowledge has that always been the sole focus of business of Rogers Cartage?

A. Yes. They do, Rogers Cartage Company, not the Sauget terminal, but there is some terminals that haul powder products

Exhibit 17

ILLINOIS ENVIRONMEN L PROTECTION AGENCY

MEMORAN

L1630200005 - St Clair
Sauget Sauget
SF - GC

DATE: January 6, 1983

TO: Division File

FROM: Tom Powell TEP - Southern Region

SUBJECT: LPC - General - St. Clair County - Cahokia/Dead Creek

This office has received reports that recent heavy rainfalls have had an impact on Dead Creek. The amount of water within the creek is as high as this writer has seen since the Agency became aware of the situation in the spring of 1980.

On January 4, 1983, Tony Townsen, the Health and Safety Officer of Cahokia, contacted this office to say that water is flowing through the blocked culvert under Judith Street. Officer Townsen was concerned that water from the contaminated portions of the creek would wash contaminants downstream. Officer Townsen was told that there is little that the Agency could do to correct the situation as it now exists, but that the Agency could sample the water as it flows under Judith to see if there is a problem.

On January 5, 1983, this office received a call from Nancy Batson, 102 Walnut St., Cahokia, 618/337-4089. Mrs. Batson lives next to the borrow pit that is adjacent to Dead Creek. She stated that water is flowing into her basement at an alarming rate and that a sump pump must be operated 24 hours a day. She wondered that if perhaps some of this water could be contaminated, since a strange faint odor is noticeable at times. After a short discussion within this office, this writer contacted Mrs. Batson to say that someone would be out, later in the day, to sample the water in her basement.

This writer arrived in the area at approximately 3:00 p.m. that afternoon. A water sample was then obtained from the south side of Judith, where the blocked culvert discharged. The water level on the south side was above the culvert. Subsequently, it was impossible to estimate the flow rate. A water sample was collected, however, near an eddy on the south side. (See lab sheets) The freeboard on the north side of Judith was approximately 4-5 feet, so the likelyhood of the water running over Judith was remote. After obtaining this sample, this writer proceeded to the Batson residence to obtain a water sample from the basement. As stated previously, water was entering the basement at a substantial rate. Mrs. Batson was told that after results are received from the lab she would be notified. With the samples in hand, this writer left the site.

TEP:jlr

cc: Southern Region

Exhibit 18

#:93-323

Jim Park
Bill Child
response

2897 Falling Springs Road
Sauget, Illinois 62206

(618) 337-5267

RECEIVED
NOV 30 1993
BUREAU OF WATER

November 17, 1993

RECEIVED IN THE
OFFICE OF THE DIRECTOR
1993

The Honorable Mary Gade, Director
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706

Dear Madam Director:

I have recently learned that your people have blocked off the southerly flow of water in "Dead Creek" at its intersection with Judith Lane in Cahokia, St. Clair County, Illinois.

As a result, due to the recent very heavy rains in the western part of St. Clair County, the water in Dead Creek is backing up and covering Queeny Avenue in the Village of Sauget.

This has caused serious problems for motorists who habitually use Queeny to get to Illinois Route 3. Only this morning, a father with his small child got stranded in the high water on Queeny and had to wade the water to get to a telephone.

Historically, Dead Creek has been a natural waterway which had its head waters some distance north of Sauget and which flowed through Sauget and Cahokia and emptied into the large canal. With the consent of the upstream owners of Dead Creek, the Village of Sauget has blocked it off at Queeny.

Hence the water covering Queeny is black flow from your blockage at Judith Lane.

I challenge your legal authority to block off the southerly drainage of this natural water course, causing problems for upstream owners.

While there has been much newspaper publicity about pollutants in Dead Creek between Queeny and Judith Lane, I am advised that tests of the water at Judith (upstream from the IEPA block) are inconclusive at best.

The State does <u>not</u> own Dead Creek and is not at liberty legally or equitable to change its natural flow.

Respectfully yours,

Paul Sauget

PAUL SAUGET
Mayor

PS/blw

cc: Mayor Mike King,
Village of Cahokia.